

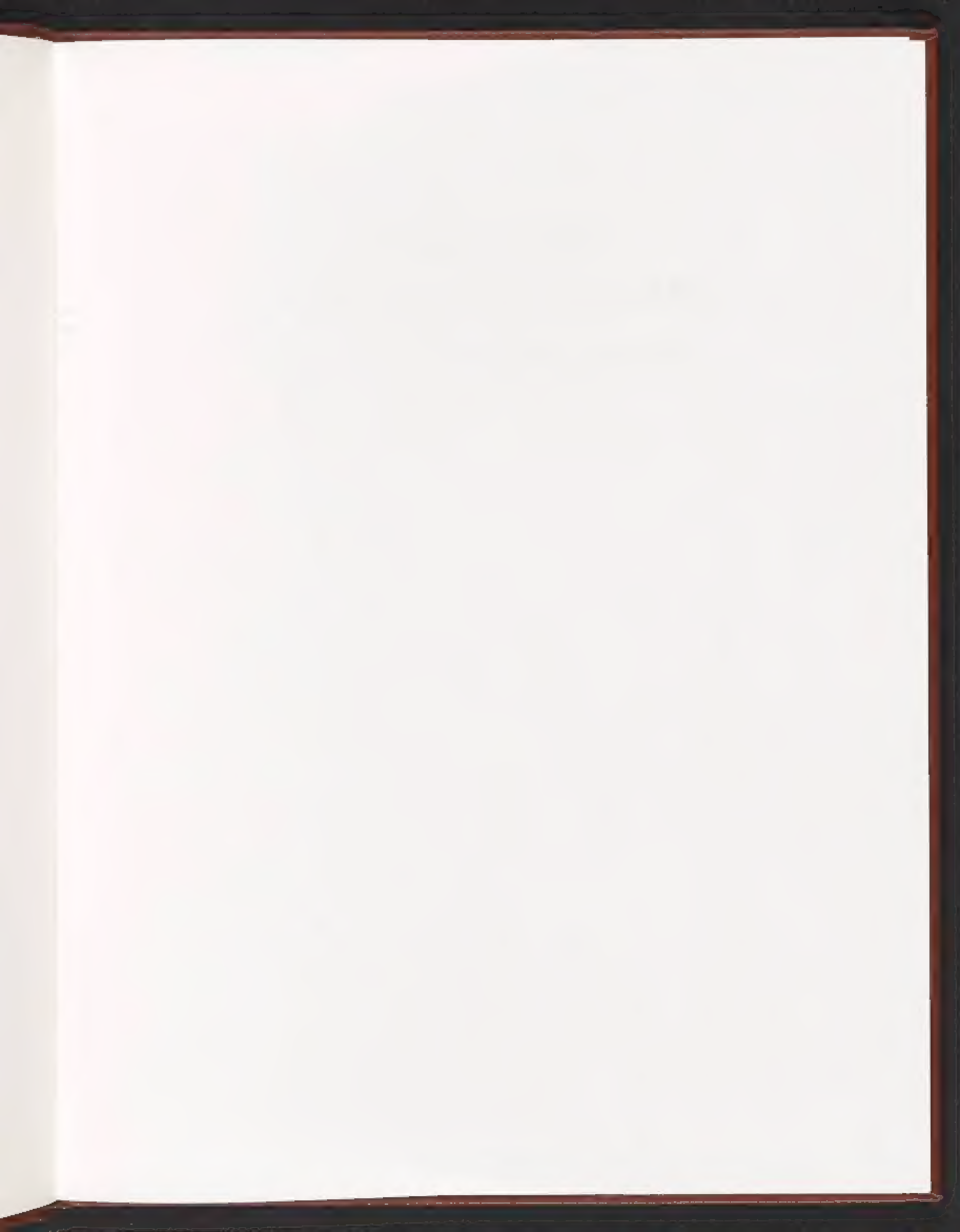
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P. MICHIGAN XVII
THE MICHIGAN MEDICAL CODEX
(P.Mich. 758 = P.Mich. inv. 21)

AMERICAN STUDIES IN

PAPYROLOGY

VOLUME 35

Editor
Ann Ellis Hanson

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THE MICHIGAN MEDICAL CODEX
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Louise C. Youtie

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To HCY

In loving memory

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Editor's Preface

Louise Canberg Youtie first published P.Mich. inv. 21 as the 'Michigan Medical Codex' in five separate installments in *Zeitschrift für Papyrologie und Epigraphik*: 65, 1986, 123-149; 66, 1986, 149-156; 67, 1987, 83-95; 69, 1987, 161-169; 70, 1987, 73-103. I and many others have long thought the Michigan Medical Codex of such significance to many aspects within Classical Studies that it should be reissued as a monograph in its own right, so as to attract the attention of historians of ancient science, textual critics, intellectual historians, and classicists, in addition to papyrologists. Through the generous cooperation of the current editors of *ZPE* and its publisher, Dr. Rudolf Habelt of Bonn, the American Society of Papyrologists received permission to republish the separate fascicles as monograph 35 in its series *American Studies in Papyrology* and to range the text as P.Michigan XVII 758 in the ongoing series of publications of papyri in the University of Michigan collection.

The work of scanning the pages from the volumes of *ZPE* and of composing the volume was done by Jeremy Taylor, graduate student in the Department of Classical Studies, University of Michigan. Jeremy brought to the project not only his keen knowledge of Greek and of the ancient Mediterranean world, but also his considerable expertise in computer manipulations. The funds under which Jeremy worked were generously made available by the acting Dean of Rackham Graduate School, Robert A. Weisbuch, through the agency of Professor Ludwig Koenen. Publication costs were, in part, offset through the generosity of an anonymous donor. To all of the above, the American Society of Papyrologists expresses its gratitude, and I, as editor of the series, add my heartfelt thanks as well. This was a project well worth doing.

Louise C. Youtie has long been associated with the University of Michigan, finishing her BA in 1932 and her MA in the following year. After her marriage to Professor Herbert C. Youtie in 1934, she too became a constant and tireless worker in Michigan's papyrology collection. Her first assignments were to prepare the indices for

P. Michigan IV, the two-volume *Tax Rolls from Karanis* that appeared in 1936, and to check the proofs for these volumes, whose total number of lines exceeds that of Homer's *Odyssey* and is nearly as long as the *Iliad*. Louise Youtie became ever more closely involved with Professor Youtie's research in papyrology and undertook an increasing number of projects on her own, publishing texts of documentary papyri and offering corrections for already published texts. In particular, she became expert in dealing with the medicinal recipes that the Greco-Egyptians of Ptolemaic and Roman Egypt jotted down on pieces of papyrus, on broken pieces of pottery, and other available writing surfaces. Her work in papyrology had so coalesced with that of her husband that when the *Festschrift P. Coll. Youtie I-II* (= *Collectanea Papyrologica I and II* = *Papyrologische Texte und Abhandlungen XIX and XX*) was presented to Herbert Youtie in April, 1976, Ludwig Koenen spoke in the following manner, not only about Herbert Youtie's many contributions to the field of papyrology, but also about those of Louise Youtie:

Your work is her merit too, and this not only in the general sense that she created the atmosphere you needed for your work, but in the very sense that she has an active share in it. She is your partner who listens to you, but also criticizes your suggestions in her own mild, but charmingly determined way, and she adds her own comments. You would publish nothing without convincing her first.

Louise Youtie spent only a few years of her adult life away from Ann Arbor, accompanying Herbert Youtie as he spent two years in Oxford and a year in Köln between 1957 and 1964. Otherwise, she was ever in the Papyrology Room, as this peregrinated about the Michigan Library System, finally coming to rest atop Hatcher Graduate Library in the legendary Room 807. Appeals for help with papyrological matters came to Room 807 from around the world, as colleagues and former students turned to the Youties. Louise Youtie answered queries about readings in specific papyri and supplied photographs, all with wondrous quickness. In the days before fax and e-mail, Louise Youtie could be counted on to ready a

response within hours of receiving your question, as I and many other beneficiaries of the Youties' attentions can attest.

The Michigan Medical Codex (P.Mich. inv. 21) occupied her for many years, but she determined to bring it to publishable form after Professor Youtie's death on 13 February 1980. It was a Herculean effort, and we are all in her debt that she brought it to so fine a conclusion. It is my hope that the Michigan Medical Codex, P.Mich. inv. 21, will reach the wider audience it so richly deserves in its new format as P.Michigan XVII 758.

Ann Ellis Hanson

Editor,

American Studies in Papyrology

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Introduction

Ann Ellis Hanson

P.Mich. XVII 758 (= P.Mich. inv. 21)¹ is an important text in papyrological studies, where it takes its place among the relatively early codices from the IV century CE.² It is an equally important text in the history of the medicine of the Greek and Roman world and in the history of the transmission of ideas, as these are passed from one generation to the next. As Mrs. Youtie's introduction makes clear (pages 1-3), the codex was probably commissioned by its owner, a practicing physician, and then considerably expanded by him with additional recipes he no doubt found helpful in his day-to-day practice among the sick. Galen seems to have been acquainted with doctors' habits of noting down useful medicaments. In his *De compositione medicamentorum secundum locos* I 1 he mentions that his friend Claudianus found the recipe Galen has just written out in his treatise jotted down in a leather notebook that formerly belonged to a physician who died.³ Claudianus thought the medicament of considerable importance to possess, because he had seen two men who were beginning to bald cured by it, with the results that their baldness not only did not advance, but the medicament even made their bald spots hirsute. Unfortunately in the case of Claudianus' discovery, the physician had written down the medicaments in symbols. Galen and unnamed colleagues were thus forced to work through the recipe

¹P.Mich. inv. 21 was not published in time to be included in Marie-Hélène Marganne and Paul Mertens, 'Medici et Medica' Proceedings of the XVII International Congress of Papyrology, Athens 25-31 May 1986 I, Basil S. Mandilaras, ed., Athens 1988, 105-146 (= Pack²). It does appear, however, as 1407.01 on the second edition of 'Medici et Medica' that Marganne and Mertens prepared for the conference 'Specimina' per il Corpus dei Papiri Greci di Medicina, held at the Istituto Papirologico 'G. Vitelli,' Firenze, 18-19 March 1996. This second edition of 'Medici et Medica,' updated to 15 March 1996, will also be published in the forthcoming Acts of that conference, edited by Manfred Manfredi and Isabella Andriolini Marsano. The codex is also included in the inventory by Andriolini Marsano, 'Papiri e scienza medica antica,' Aufstieg und Niedergang der Römischen Welt, Wolfgang Haase, ed., Berlin - New York 1993, 458-562, and appears as number 121 on page 531.

²Described below, pages 1-3. See also the recent, general discussion of the codex format in Isabella Andriolini, 'Precisioni sulla data di alcuni testi di medicina in forma di codice,' Proceedings of the 20th International Congress of Papyrologists, Copenhagen, 23-29 August, 1992, Adam Bulck-Jacobsen, ed., Museum Tusulanum Press: Copenhagen 1994, 400-13.

³On the composition of medicaments according to places, XII 472.17-476.8 Kühn.

point by point in order to determine what ingredients were being indicated by the various symbols, and, while one doctor thought one thing, another thought something else. As a group, however, they were hoping to discover the truth through trial and error. Galen has written down the recipe as it seemed to them then, but he also promises to report to his readers any additional findings that subsequent trials might in future yield about the ingredients.

By contrast, the additional recipes in the Michigan Medical Codex are not jotted down in a leather notebook, but into the bottom margins of the recipe book, and in folios G M these additions more than double the number of medicaments originally copied out by the scribe (below, pages 56-79, plates 7a-13b). Fortunately, in this instance the physician-owner wrote out his marginal jottings in full enough form for us to understand them, at least in part, and not merely in symbols. At one point, he also seems to report his own experiences in the employment of a plaster intended to ease pain in a case of impacted bowels and severe constipation (H 8-9, *ποσὶ νόσῳ*, pages 59-60). In addition, the physician-owner also corrected the main text, for the scribe he employed was sometimes careless. To be sure, the scribe also did some work of correction to the text he copied, and his professional's hand (Hd. 1) differs significantly from the faster and smaller cursive in the bottom margins that were penned by the physician-owner (Hd. 2). The physician-owner's ligatured letters suggest that he was writing with greater speed than was the professional scribe, and he also employed a blacker ink than the scribe. Mrs. Youde has dated both hands to the IV century CE.

Because the codex was purchased from dealers, we do not know the locality where it was unearthed, and thus have no clue as to where in the province of Egypt the physician-owner lived and practiced his medicine. On the other hand, the sophistication of his recipe collection, drawing its therapies from the work of considerably earlier pharmacologists also known to Galen (for which, see below), makes it likely that he had some contact with a medical library of some sort, either in Alexandria, whose medical schools remained important

throughout Byzantine times,⁴ or in one of the locales which has yielded up other papyri of medical content.⁵ The papyri of Alexandria are totally lost to us, due to the dampness of the capital and the entire Delta region, and even if the codex had been copied in the capital, it could not have survived to the XX century, unless it had been carried further south to the drier terrain that became desert during the Roman and Byzantine periods. A recent survey of published medical papyri⁶ shows the metropolis of Antinoupolis leading the list of localities with 27 items of medical content among the papyri published to date, strongly suggesting a considerable medical presence there.⁷ At the same time, the majority of the texts from Antinoupolis were copied in the VI-VII centuries CE; only three were copied as early as the III-IV centuries CE, and none earlier. Similarly, the Arsinoite village of Tebtynis, with its oracular and healing shrine of the crocodile god Suchos (Sobek), has yielded 10 items, yet these are considerably earlier in date than the Michigan Medical Codex, copied, as they were, in the I-II centuries CE. Perhaps the codex derived from the metropolis of Oxyrhynchus, for it stands second only to Antinoupolis with 22 papyri of medical content, and these show a range of date more in harmony with the Michigan Medical Codex, from the I-IV centuries CE. Or, perhaps it came from some village in the larger district of the Fayum oasis (Arsinoite nome), since 20 items derive from this area, and these also show greater variety in date, from the III BCE to the VI CE.

Whatever the origin of the Michigan Medical Codex, it is by no means a product out of the mainstream of medical and pharmacological thinking during the High Roman Empire, but is rather quite in touch with recipes also known to Galen and the later compendiasts Oribasius,

⁴Cf. Ann Ellis Hanson, 'Fragmentation and the Greek Medical Writers,' forthcoming in *Appremata I*, Glenn Woth, ed.

⁵For a general discussion of the evidence available on Greek and Roman doctors, working together not only in medical matters, but also in other activities, see Vivian Nutton, 'The medical meeting place,' *Ancient Medicine in its Socio-Cultural Context I*, Ph.D. van der Eijk, H.F.J. Horstmannshoff, P.H. Schrijvers, edd., Amsterdam - Atlanta 1995, 3-25.

⁶My tabulations are drawn from the material in Andorlini Marcone (above note 1), 467 and 550-555.

⁷See also Marie-Hélène Marganne, 'La "collection médicale" d'Antinoupolis,' *ZPE* 56, 1984, 117-121.

Aetius, and Paulus Aegineta. The millennium that began with speakers of Greek arriving in large numbers in Egypt, following in the wake of Alexander and his Macedonians, and ended with the Arab conquest and its aftermath, brought Greek medical texts of many genres not only to Alexandria, but to the metropoleis and villages of the Egyptian countryside.¹ Mrs. Youtie has carefully noted at many points in her commentary correspondences between recipes in the Michigan Medical Codex and recipes that have come down to us in the writings of authors who survive in manuscript traditions. What is also clear from her notes is how vital a role the availability of the Greek medical texts in machine-readable form (TLG CD-ROM) now plays in discovering the correspondences between recipes in the Michigan Medical Codex and the similar lozenges and pills, and wet and dry plasters in the treatises of these other medical writers. As is frequently the case, the ingredients in a particular recipe display a striking degree of continuity from copy to copy, whether on a papyrus or in the manuscripts, despite the vagaries of transmission through hand-written texts over centuries.² For example, a plaster that in the papyrus codex is said to work 'wonderfully for ulcers and other conditions, because the affected parts of the body are healed by the application of the so-called *parygmon*, a medication not to be despised' (A recto 4-8, pages 4-9), is compounded of pig fat, wax, and the metals white lead and litharge. Computer searches of the works of Galen, Oribasius, Aetius, and Paulus Aegineta reveal not only the same four ingredients compounded together in a prescription usually also labeled a *parygmon*, but the proportions among the ingredients are virtually the same from author to author. Some compound a little, others a lot; some measure in drachmas, others in ounces, but invariably it is nearly twice as much pig fat as wax and about one-quarter of each of the two metals as the wax (see the chart on

¹For a recent survey of the contents of published medical papyri, see Marie-Hélène Marganne, 'La médecine dans l'Égypte romaine: les sources et les méthodes,' *Aufstieg und Niedergang der römischen Welt* 37.3, Wolfgang Haase, ed., Berlin - New York 1996, 2703-2740.

²In addition to A recto 4-5, see also B recto 2-14, pages 13-17; C verso 2-8, pages 23-27; D recto 12-15, pages 26-32; E recto 9-15, pages 36-44. Mrs. Youtie's notes to individual lines also draw attention to other, yet less extensive affinities between recipes in the codex and the medical writers.

page 9). For papyrologists, struggling to read a medicinal recipe written in a difficult hand on an abraded and lacunose surface, this degree of textual conservatism is, to be sure, a wonderful aid to restoration and understanding. To historians of medicine, however, the individual recipe's ability to preserve a relatively high degree of textual integrity in numerous hand-written copies from author to author, from century to century, underscores both the continuing interest in the recipe and a recipe's own completeness as an integral text in its own right. To be sure, the editors of *P.Anc.* III 186 emphasized the fact that this VI-century CE papyrus codex with medicinal recipes from Galen's *De compositione per genera*, books I, II, and VII, revealed significant textual variations from the only readily available published edition of the treatise (that by C.G. Kühn, 1827).¹ Nonetheless, as the Michigan Medical Codex makes clear, this notion of 'textual integrity' involves, first and foremost, the overall contours of the individual prescription and its ingredients, and does not necessarily extend either to its precise wording, or to its orthography. Additional ingredients may also enter a given copy of a prescription, for these were living texts and continually in use. The Michigan Medical Codex is one of the best examples of such a 'living text.' New prescriptions are added; nothing seems to have been subtracted. The written text is simply being ameliorated to reflect current practices.²

The format in which the prescriptions are presented in the Michigan Medical Codex is the common, fourfold one, consisting of title (*prographê*), indication of the conditions for which the medicament is useful (*epangelia*), enumeration of the ingredients with quantities given (*synthesis*), and the method of preparation (*skemasia*).³ Each recipe has its own heading in *eisthesis* to explain what the prescription mediated - 'A plaster which promotes cicatrization: it is effective against foul ulcers, discharging and chronic ulcers and wounds that are scarred over'

¹XIII 396-536, 956-1034 Kühn.

²Cf. Ann Ellis Hanson, 'Papyri of medical content,' *Yale Classical Studies* 28 (1973) Papyrology, Naphtali Lewis, ed., 1973, 15-47, espec. page 45.

³Cajus Fabricius, *Galenus Exzerpte aus älteren Pharmakologien*, Berlin - New York 1970, 34-38, with also a 'short-form.'

(B verso 1-14, pages 17-21). After the ingredients are listed and the directions for compounding and applying given, there come in this instance other subsidiary uses - 'It is also good for ulcers caused by burns.' Lines and spaces separate recipe from recipe, since in recipe catalogs it is imperative for users to know exactly where one recipe finishes and a new one begins.¹³

The different contexts into which one and the same recipe can be inserted, however, varies considerably, since most recipes can adapt to a variety of catalog styles and organizing principles. Some recipe catalogs are ranged according to types of medicament; others, according to parts of the body affected; and, less frequently, according to the conditions to be medicated. The organizing principle in the Michigan Medical Codex, one of the largest catalogs of therapeutic prescriptions on papyrus surviving from antiquity, seems to be according to type of medication, with pills and lozenges preceding wet and dry plasters. Galen followed a similar pattern in the eighth book of his *De compositione medicamentorum secundum locos* (XIII 116-227 Kuhn), in which first pills and lozenges, then plasters medicate stomach ailments and digestive disorders. The thirteen folios of the Michigan Medical Codex, written on both sides, were assigned the inventory designations 'A' and 'A verso' through 'M and M verso,' yet this alphabetical ranging implies nothing about the original ordering of the codex. Rather, its most likely order is I recto and verso, J recto and verso, L verso and recto, G recto and verso, H recto and verso, K recto and verso, M recto and verso, followed by A-F (below, page 64, note to lines 1ff.). Folio L represents the turning point in the codex, as the therapeutic methods turn from the pills and lozenges to the plasters (below, pages 72-76).

Hippocratic physicians were already collecting therapeutic recipes in the V century BCE. The treatise *Affections* (*Aff.*) assures us that the recipe collection upon which it was drawing had already achieved written form: 'If pain in the back or side is likewise present for this patient, give what has been written in the Remedies (*Pharmakitis/Pharmaka*) for

¹³Cf. Ann Ellis Hanson (above, note 4).

pleuritic pain.¹⁴ Two of the large gynecological treatises, *Diseases of Women I* and *Diseases of Women II* (Mul. I-II) also advise medicaments from a collection entitled *Women's Remedies* (Gynaikaia), although the form in which the collection was circulating is not made clear: when treating uterine lesions, 'in the evening give her a thick potion and whatever is suitable to drink from the *Women's Remedies*'; when medicating a red flux, 'make up her bed with the foot-end higher and administer as a drink an acceptable prescription from the *Women's Remedies*.¹⁵ Although chronological markers are few in the recipe collections of the Corpus, the ones which are present suggest that collections were taking shape over a considerable period of time: in the case of *Diseases of Women II*, an apparent *terminus post quem* of about 600 BCE, the approximate date when one of its prescriptions achieved written form outside the Corpus, and a *terminus ante quem* of the mid-IV century BCE, the approximate date for the prescription named after the medical writer Philistion.¹⁶

The habit of naming a therapeutic medicament after the physician/pharmacologist from whose works it was taken, or with whom it was closely associated, becomes far more frequent in the recipe collections of the Roman period. Galen often assigns to prescriptions the names of earlier medical writers,¹⁷ and a papyrus letter written in 58 CE from Charis to Dionysius, perhaps both of them doctors, with its reference to the 'plaster of Arcagathus,' amply demonstrates that this was a common way to designate a medicament.¹⁸ Arcagathus is presumably the

¹⁴Pharmakitis in Hipp. Aff. 9, VI 216.3-12 Littré; also 15, VI 224.12 Littré; 18, VI 229.4-5 Littré; 23, VI 234.22 Littré; 28, VI 247.9-10 Littré; 40, VI 250.11-12 Littré; Pharmake in Hipp. Aff. 18, VI 226.9-10 Littré and 19, VI 240.21-22 Littré. The references suggest that the collection included analgesics, anti-febriles, and appropriate foodstuffs and potions.

¹⁵Hipp. Mul. I 64, VIII 132.23-24 Littré, and II 113, VIII 244.4-5 Littré; the references suggest the collection included appropriate potions.

¹⁶Hipp. Mul. II 113, VIII 244.5 Littré, and 11 101, VIII 386.9-10 Littré, and cf. Ann Ellis Hanson, 'Therapies for Women's Diseases as Bearers of Meaning,' forthcoming in *Gender and History*. See also Hermann Grensemann, *Die Kynische Medizin: Teil I*, Berlin 1975, 59, for the fact that Aeginetan weights and measures for ingredients in Hippocratic medicaments imply that the recipes achieved written form no later than about 480 BCE; recipes in both Mul. I and *Superfet.* occasionally employ Aeginetan measurements.

¹⁷Passim in Caelius Fabricius (above note 12).

¹⁸P. Merc. I 13; see discussion in Androsini: Marcone (above note 1), 462-63.

physician Pliny the Elder, following the annalist Cassius Hemina, described as 'the first Greek doctor at Rome' (NH XXIX 6 12-13), coming from the Peloponnese in the consulship of L. Aemilius Paullus and M. Livius Salinator (219 BCE).¹² What is unclear in the papyrus letter, and often elsewhere in the writers of pharmacology, is whether a recipe was taken directly from the writings of the earlier physician whose name is attached to it, or whether the recipe had been previously excerpted and inserted into some other recipe collection.

The Michigan Medical Codex participates fully in the practice of naming prescriptions after medical writers, citing recipes of Azanites (B 2, pages 13-14), of Dionysius (C 8, pages 22-23), of Heras (E 5, pages 36-40), of Telamon (E 9-15, pages 36 and 40-44), and of Hygienus (D 4, pages 28-30). It is, however, by no means clear whether the scribe has himself been asked to make a unique copy, gleanng recipes for plasters from works of previous writers, or, as seems more likely, whether he was simply copying an exemplar, itself ultimately dependent on a variety of sources. Only the 'plaster made from rue' (*peganera*) that 'is effective for spreading ulcers, wounds, abscesses, and lichen-like skin eruptions' is given a specific reference - 'from the second book of Dionysius.' But the prescription is unknown elsewhere, and the number of doctors named 'Dionysius' is large: Isabella Andorlini Marcone considers four as the more likely candidates on chronological grounds for having produced this *peganera* in the Michigan Medical Codex.¹³

¹²Recent discussions of Aesculapius and his role in the arrival of Greek medicine at Rome: John Scarborough, 'Roman Medicine to Galen,' *Aufstieg und Niedergang der römischen Welt* 37.1, Wolfgang Haase, ed., Berlin - New York 1993, 22-25; Vivian Nutton, 'Roman Medicine: Tradition, Confrontation, Assimilation,' *Aufstieg und Niedergang der römischen Welt* 37.1, Wolfgang Haase, ed., Berlin - New York 1993, 53-58; Gabriele Marasco, 'L'introduzione de la medicina greca a Roma: una dissension politica et ideologica,' *Ancient Medicine in its Socio-Cultural Context* 1, Ph.D. van der Eijk, H.F.J. Horstmannshoff, P.H. Schrijvers, eds., Amsterdam - Atlanta 1995, 35-45. For a new approach to the acculturation at Rome of Greek medicine and Greek practitioners, see Karin Nijhuis, 'Greek doctors and Roman patients: a medical anthropological approach,' *Ancient Medicine in its Socio-Cultural Context* 1, Ph.D. van der Eijk, H.F.J. Horstmannshoff, P.H. Schrijvers, eds., Amsterdam - Atlanta 1995, 49-67.

¹³Andorlini Marcone (above note 1), 465-66 and note 12: (1) Dionysius, an anatomist and contemporary of Herophilus, who is perhaps mentioned in the papyrus SB VIII 9860 e.4; (2) Dionysius, an Empiric and contemporary of Heracleides of Tarentum; (3) Dionysius, a Methodist mentioned by Soranus and Galen; (4) Dionysius to whom the above-mentioned papyrus letter was sent (P.Mert. I 12, fr 58). Cf. also the larger

The best known of the early pharmacologists mentioned in the Michigan Medical Codex is Heras of Cappadocia, who practiced at Rome between ca. 20 BCE and 20 CE, and the author of the drug book *Narthex*.¹¹ Two numbered columns from a papyrus roll dated to the end of the III century CE, or the beginning of the IV, shows that Heras' work was still in circulation about the time the Michigan Medical Codex was copied. The roll presents an anonymous collection of medicinal prescriptions to prevent loss of hair (P.Berl. M. 131), but its contents can be identified as from Heras' drug book, because Galen has quoted this first recipe against baldness at the beginning of his discussion of the topic in *De compositione medicamentorum secundum locos* I 2 (XII 430.8-431.5 Kuhn), specifically attributing it to Heras "in the *Narthex*."¹² As Marie-Hélène Marganne has suggested, this prescription antedates Heras by nearly a century, for Heras was himself inspired by a quite similar recipe attributed to Heracleides of Tarentum by Criton, physician to Trajan (Galen, *De compositione medicamentorum secundum locos* I 2 XII 435.8-15 and 436.4-7 Kuhn).¹³ Galen's frequent citations from Heras show that he valued the work of this pharmacologist from a previous century, but whether he invariably knew Heras' work at first hand remains unclear.¹⁴ Heras' name, however, was not copied by the scribe of the

assemblage of doctors named Dionysius by Max Wellmann from which Anderlini Marcene was drawing SE V 1, Stuttgart 1913, col. 924, s.v. 117 Dionysius.

¹¹For Heras' dates, see Cajus Fabricius (above note 10), 183-85 and 242-246. For the *Nápoñξ* and its other apparent titles, Galen, *Comp. per gen.* 7 13, XIII 416, and the discussion in Fabricius, 183 and note 8. For Heras and a republication of the first column from a papyrus roll of Heras' *Narthex*, P.Berl. M. 131 texts in Pack' 23P2), see Marie-Hélène Marganne, "Une étape dans la transmission d'une prescription médicale: P.Berl. M. 131," *Miscellanea papyrologica 14 Papyrologica Florentina VIII*, Rosario Pintaudi, ed., Florence 1980, 179-81. See also H. Gossens, SE VI: 1, Stuttgart 1912, col. 629, s.v. 4 *Ἡρας*.

¹²This recipe enjoyed considerable popularity in antiquity, for it was known not only to Galen, but also with slight modifications to Dioscorides, pseudo-Galen, Cribasius, Alexander of Tralles, Paulus Aegineta, and Theophrastus Bombastus, refs. in Marganne, above note 21, 183, notes 24-29).

¹³Cf. Cajus Fabricius (above note 10), 183-85, for another recipe Heras took from Heracleides (Galen, *Comp. sec. loc.* V 1, XII 511 Kuhn) and for Galen's citations from Heras.

¹⁴In *Comp. per gen.* V 2, XIII 794.19-794.1 Kuhn, Galen cites Heras' recipes for plasters, including a version of the plaster of Asanites that appears in the Michigan Medical Codex (B 2-14, pages 13-17), at least five of Heras' plasters, however, Galen derived from their citation by Criton, who reports them word for word. Galen went on to worry about apparent discrepancies in the quantities reported in the fourth plaster between what Heras gave and what Criton gave; Galen was able, however, to resolve most

Michigan Medical Codex at E 5, when he first wrote out his text, but 'of Heras' was later inserted before the opening rubric 'the grey plaster' by the physician-owner. As Mrs. Youtie notes, both the scribe and the physician-owner also failed to mention that Heras was the author of the 'parygron' which appears at A 6-13.

Like Dionysius and Heras, the names of Azanites, Hygienus, and Telamon also appear in Galen's drug books. Galen knew the plaster of Azanites that is contained in the Michigan Medical Codex (B 2-14, pages 13-17) apparently from its citation by Heras (*De compositione per genera* V 2, XIII 784.19-785.15 Kuhn). The plaster of Hygienus¹³ in the Michigan Medical Codex is otherwise unknown, but Galen also knew some of Hygienus' prescriptions at least through the agency of Heras. Galen says Heras deemed one of Hygienus' plasters 'the best in existence' (*De compositione per genera* II 3, XIII 511.4-513.6, and IV 14, XIII 747.13-748.18 Kuhn). Telamon is the most shadowy pharmacologist mentioned in the Michigan Medical Codex, although he seems to have practiced at Rome in the middle of the 1 CE. Galen mentioned him only once by name and may well have learned of him only through the agency of Asclepiades Pharmakion (*De compositione per genera* II 14, XIII 524.2-529.5 Kuhn).¹⁴

Although a product, then, of the IV century CE, the basic text of the Michigan Medical Codex was combining and taking its shape over considerable time. Although its physician-owner practiced his medicine at some distance up the Nile from Alexandria, this was no backward product from some deprived rural area. The work of famous Greek pharmacologists from an earlier time, practicing in Rome early in the 1 century CE, such as Heras, were available to the physician-owner, and his scribe incorporated a considerable number of their remedies and prescriptions. In addition, the habit of the physician-owner, whereby he squeezed into the copious bottom margins some twenty additional recipes on related topics, amply makes clear the means by which recipe catalogs

of the discrepancies by converting various units of measurement so that the amounts could successfully be compared and harmony restored.

¹³For other references to Hygienus in Galen, see H. Gossens, *RE* IX 1, Stuttgart 1914, col. 97, s.v. Hygieinos; cf. Cajus Fabricius (above note 12), 244.

¹⁴Cf. Cajus Fabricius (above note 12), 192-98.

expanded. Collecting useful recipes and medicaments was an important activity for medical professionals, and the Michigan Medical Codex is the finest and most copious example we have of this activity, eminently demonstrating how widespread and long-enduring were some prescriptions that were associated with the pharmacologists and physicians of previous centuries. As a genre, the recipe catalog was inherently a very flexible entity, able to accommodate recipes excerpted from a number of other drug books, while, at the same time, preserving to a surprising degree the textual integrity of the individual recipes that comprised the catalog.

17 April 1996

THE MICHIGAN MEDICAL CODEX

(P.MICH.XVII 758 = P.Mich. inv. 21)

P.Mich. Inv. 21 was purchased in Egypt in 1920 and is of unknown provenance. It is dated in the Inventory prepared by A.S.Hunt to the fourth century A.D. It is composed of 13 papyrus fragments presumably from consecutive pages, although not necessarily in their present order. The six largest pieces, 21 A-F, are from the body of the text and preserve neither upper nor lower margins. The remaining seven fragments, 21 G-M, are smaller in size and come from the bottom inner corners of the codex.¹⁾ In varying degrees they preserve the deep lower margin and the wide inner margin, including cord holes²⁾ and in one case, 21 J, a 9-10 cm. length of cord still in place. A smaller piece of ca. 2 cm. is caught between two horizontal holes in the preceding fragment, 21 I.

Our 13 fragments or leaves = 26 pages were possibly from a quire of 8 sheets = 16 leaves = 32 pages.³⁾ On the original size of our codex we can make a good estimate of its probable width as ca. 14 cm. This is based on the complete width of written surface in 21 A and D which is 9 cm., plus 2.5 cm., the width of the inner margin to the holes in 21 E and G-M, plus an estimated outer margin of 2.5 cm. The probable height of our codex cannot be estimated with any certainty. The longest written surface is that of 21 A which is 11 cm. but the text is incomplete at both top and bottom. The lower margin is 4 cm. in 21 H-M, and the upper margin an estimated 2.5 cm. This gives us a minimum height of 17.5 cm. and a width of ca. 14 cm., or approximately 14 cm. x 18-20 cm.⁴⁾

1) These fragments can in no case be assigned to any of the upper portions of the codex.

2) See *MPER N.S. XIII* no. 19, Tafel 16, for a photograph showing the cord holes in a fragment from a medical (?) papyrus codex of the second century. For a more distinctive picture of cord holes and a style of writing not unlike that of our codex, see E.G.Turner, *Greek Manuscripts of the Ancient World* (Princeton, 1971), No. 14, a late third century codex of the *Iliad*.

3) On the construction of a codex see E.G.Turner, *The Typology of the Early Codex* (U. of Penn. Press, 1977), pp. 55ff. For a quire of 4 sheets = 8 leaves = 16 pages in a fourth century codex, see P.Ryl. I 28, introd. and Plate V. For a quire of "9 sheets (each 260 x 295 mm.) laid above each other, vertical fibres uppermost, and then folded to form a single quire of 18 leaves, 36 pages," see E.G.Turner, *Greek Manuscripts*, No. 14 (cf. preceding note). For a large quire of 32 sheets, similarly formed in an early third century codex, see *The Chester Beatty Biblical Papyri*, Fasc. III, Suppl., p. ix.

4) For codices of 13-15 cm. in width and 20-30 cm. in height see the list in E.G.Turner, *Typology*, pp. 18-22.

The papyrus is medium brown in color and the ink is dark brown, almost black.⁵⁾ The scribe used a blunt pen and the resulting letters are thick and somewhat coarse. Slanting slightly to the right, they are without ligature and normally run to 18-23 letters per line. Alpha and delta often have a similar appearance, as also mu and nu; pi is made with two strokes, the second curving inward, so that it often resembles omicron. The letters are for the most part bilinear with the exception of E, P, U, Q, W and occasionally r which drop below the line. Abbreviations are infrequent: final nu at the end of a line is found as a short horizontal stroke above the preceding letter,⁶⁾ as in Ενο[?] in 21 B v.12; and μοτ(Λατ) is found in B v.11 with an oblique stroke through the bottom of tau. Symbols for drachms (δ), ounces (Γο), and pounds (Π) are employed throughout. Cf. Gal. XIX 750.⁷⁾

Corrections and additions are entered above the line by the scribe and also by a second hand using very black ink. The second hand has further filled all of the lower margins of 21 G-M with additional material. This hand was in all likelihood that of the physician-owner of the codex. Writing cursively with a finer pen and employing much smaller letters and frequent abbreviations, he managed to attain as many as 8 lines of ca. 45 letters each and still keep a bottom margin of .5-1 cm.

Punctuation in the body of the text is effected by a blank space within a line, high points, paragraphoi, forked paragraphoi, a blank space of one line, and indentation of lines. Marginal symbols are found only in the second hand in 21 A, 7; H, 8-10; M, 5-10. Cf. notes ad loc.

Our codex is almost entirely composed of medical recipes for plasters or poultices to be applied to wounds, ulcers of various kinds, carbuncles, Herpes, erysipelas, ruptures of sinews or tendons, surgical incisions, fractures, etc. Additional recipes of the same type were added in the deep margins at the bottom of each page from 21 G-M and presumably also in the missing lower margins of 21 A-F. Our codex is reminiscent of the collections of recipes of the ancient medical writers and the further collections cited and used by those writers.⁸⁾ Cf., e.g., the thirty consecutive recipes for cicatrizing plasters in Galen XIII 524-534. The first twelve recipes he took from a collection of Asclepius which included recipes attributed by Asclepius to Marcellas, Euphranor, Attalos, Pamphilos, Telamon,⁹⁾ and Moschion. The

5) On the use of brown metallic inks beginning in the middle of the third century A.D. see E.G.Turner, *Greek Manuscripts*, p.22 and footnote 3.

6) For this abbreviation occurring in well-written literary works from the middle of the second century onward, see E.G.Turner, *Greek Manuscripts*, p.17.

7) *Opera omnia*, Vols. I-XX (Leipzig, 1821-1833), ed. C.G.Kühn.

8) For collections of medical recipes in papyri and ostraca see Pack² 2190-2433 (passim), *Sammelbuch VIII* 9860, P.Mich. Inv. 482 (*Le Monde Grec*, 555), *MPER N.S. XIII* (passim), P.Haun. III 47.

9) For the recipe of Telamon (?) in our codex see E, 9-15.

remaining eighteen recipes were taken by Galen from a collection of Andromachos, who incorporated recipes of Alcibiades, Telephanes, and Pouplius among those of his own. In like manner our codex contains the parygon of Heras,¹⁰⁾ the Azanites recipe,¹¹⁾ an unknown ~~recipe~~ (rue) plaster from the second book of Dionysius,¹²⁾ an unknown ~~recipe~~ plaster of the physician Hygienus,¹³⁾ a ~~recipe~~ (grey) plaster of Heras,¹⁴⁾ and the ~~recipe~~ (yellow) plaster of Telamon.¹⁵⁾

Our codex was perhaps privately commissioned by the physician-owner who intended to collate it with its exemplar and to add further recipes from other collections which he had at his disposal.¹⁶⁾ The text contains errors on almost every page, some corrected by the scribe, some by the owner, and others left uncorrected. The errors are more numerous than would normally be allowable in a well-written text by a professional scribe.¹⁷⁾ But in spite of errors the text maintains the remarkable adherence to the traditional recipes which is characteristic of the medical texts on papyrus.¹⁸⁾

10) For this recipe see A, 6-13. The attribution to Heras was omitted as it was also in E, 9, where 'Hed was added by the second hand at the beginning of the line in the space left by the indentation of the line.

11) See 21 B.

12) Only the title of the recipe is preserved in 21 C, 7, and apparently no "recipe with rue" attributed to Dionysius is to be found in any of the ancient medical writers.

13) For the known recipes of Hygienus see 21 D, note to line 4.

14) See 21 E, 5-8, with commentary.

15) See footnote 8. The identification of this recipe is not entirely certain. For the occurrence in papyri of known physicians prior to the second century A.D. see I. Andorlini, *L'apporto dei papiri alla conoscenza dei medici pregalenici*, *Atti del XVII Congresso Internazionale di Papirologia*, II (Napoli, 1984) 351-355.

16) On texts privately commissioned for working purposes see E.G. Turner, *Greek Papyri: An Introduction* (Princeton, 1968), p. 96.

17) Cf. E.G. Turner, *Greek Papyri*, p. 95.

18) Cf. A.E. Hanson, *Papyri of Medical Content*, *Yale Classical Studies*, vol. 28, 1985, p. 26.

P.Mich. Inv. 21 A

8.7 x 10.5 cm.

[...]

Plate 1a

[...].ουα [καὶ προσ-]
 [ἐχ]ω ἐν καὶ ἐν ἐν ἐν ἐν
 4 [το]ν δὲ δὲ δὲ δὲ καὶ ἐν
 [ἐχ]ω ἐν ἐν ἐν ἐν ἐν ἐν ἐν
 [ἐχ]ω ἐν ἐν ἐν ἐν ἐν ἐν ἐν
 [ἐχ]ω ἐν ἐν ἐν ἐν ἐν ἐν ἐν
 8 [ἐχ]ω ἐν ἐν ἐν ἐν ἐν ἐν ἐν
 [ἐχ]ω ἐν ἐν ἐν ἐν ἐν ἐν ἐν
 [ἐχ]ω ἐν ἐν ἐν ἐν ἐν ἐν ἐν
 [ἐχ]ω ἐν ἐν ἐν ἐν ἐν ἐν ἐν
 12 [ἐχ]ω ἐν ἐν ἐν ἐν ἐν ἐν ἐν
 [ἐχ]ω ἐν ἐν ἐν ἐν ἐν ἐν ἐν
 [ἐχ]ω ἐν ἐν ἐν ἐν ἐν ἐν ἐν
 [ἐχ]ω ἐν ἐν ἐν ἐν ἐν ἐν ἐν
 16 [...]
 [...]

3. καὶ ἐν 4. καὶ ἐν 9, 10. παρ. δ, read δ 12. συνιστάται

Translation

... and, (when wanted) for use, apply the medication to a piece of finest linen. It works wonderfully for ulcers and other conditions. For the affected parts of the body are healed by the application of the so-called "paryggon", a medication not to be despised. 44 drachms of fresh swine fat, that which they call "axunge", 24 dr. of white wax, 6 dr. of white lead, 6 dr. of litharge. The melted soluble ingredients are combined with the powdered dry ingredients; and, in time, the medication will take on consistency. This plaster heals the affected parts of the body just as other similar medications ...

2-4. For the illustrative restoration see Hipp., περὶ ἐλκῶν 4 (ed. Littré VI 404): Οὐ καὶ οὐδ' ἐπιβάλλειν τὰ φάρμακα, πρὶν ἂν πᾶν ξηρὸν ποιήσῃ τὸ ἔλκος· τότε δὲ δεῖ προστιθέναι, ἀναπογγίλῃν δὲ τὸ ἔλκος πολλὰκις ἐπὶ γῆ, καὶ αὖθις δὲ δὲ δὲ δὲ καὶ καθαρὸν προστίσῃν (-έχων) πολλὰκις. "No medicated plasters are to be used, until you have made the ulcer entirely dry; then one may apply them; the ulcer is to be frequently sponged clean, and in turn a dry clean piece of cloth is to be frequently applied to it."¹⁹ For the verb ἐπιβάλλειν (-τίειν-) in place of προστίσῃν, cf. περὶ ἐλκῶν 11 (VI 410): ... δὲ δὲ δὲ δὲ καὶ καθαρὸν πῶς καὶ ἐλαίῳ τέλει, "apply below a fine, clean piece of cloth moistened in wine and oil."

¹⁹ The translation is adapted from that of Francis Adams, *The Genuine Works of Hippocrates*, Baltimore, 1939, p. 326.

But cf. also Aëtius XV²⁰⁾ p.103, 1 τοῦτ' ἐστὶ τῶν νεοσποσμάτων ἐν χροῖαι ἀπὸ οὗτο. The spacing in our text could perhaps accommodate the reading: 1. τ(ο)σοῦτα ἐστὶ νεοσποσμάτων ἐν χροῖαι κτλ., "... being effective in cases of persons wounded in the tendons; in using it, apply the medication to a piece of finest linen." If νεοσποσμάτων happens to be right, it would appear that the text on Inv. 11 A verso preceded that on A, and that the long title of A verso, 7ff., beginning ἐκποσὺν ὁμοῦ, introduced the paryggon recipe of A.²¹⁾

4. After τοῦτ' the writing is almost completely obliterated, but the points of ink are more compatible with the suggested text, than the possible alternative τοῦτ' ὅτι καὶ πᾶσι γινώσκουσιν. But cf. the following note.

5ff. [ἐλκυσ]: For this restoration cf. Gal. XII 325,7 ... τὸ ὅτι καὶ ἐὰν τοῦτο μίγνεται καὶ τοῖς ἑλκυσ ποσποσμοῖς πυρρῶν, οὕτω εἰς τὴν καὶ τὸ καλῶμενον πύργον, "... when pig fat in like manner is mixed with medicaments which heal ulcers, the remedy called paryggon is of such a kind." Cf. also XIII 399,15. In XVIII B 598,10,²²⁾ the third treatise of Hippocrates on fractures, is the following: τὰ τὰ δὲ ἐλκυστα καὶ πυρρῶν καὶ φάρμακα, καὶ εἰς τὸ τὸ καλῶμενον πύργον ὁμοῦ τὸ τε τετραφάρμακον ὁμοῦ, ἀπὸ λίγνων πρὸς οὕτως τὸ ποσποσμὸν μίγνεται, ἀποδοῦναι δὲ ἐλκυστα τὸ ἑλκυσ. "For the medicaments which check inflammation and are soothing, such as those called the paryggon and the tetrapharmakon, protect the affected part from inflammation and are effective against the putrid ulcer." Cf. also Aët. XV, pp. 46,16: 126-7. Paulus Aegineta²³⁾ III 412 καὶ τὸ ἑλκυστα τὸ καλῶμενον πύργον (τὸ) τὸ ἐλκυσ ποσποσμοῖς καλῶμενον.²⁴⁾ "If the parts are ulcerated, use the paryggon or the plaster called that with pompholyx." Cf. Gal. XIII 952 and Aët. XV, p.80, where our recipe is paralleled, for use of the paryggon to heal minor inflammations (ποσποσμοῖς καὶ φάρμακα). In his repetition of the paryggon of Heras among his αἱ λευκαὶ φαντασμοί, taken from the ἐποσποσμοῖς (XIII 512-3), Galen says of it: ἄλλοι ποσποσμοῖς, ἀποδοῦναι,²⁵⁾ καλῶμενον, ἀποδοῦναι, ἀποδοῦναι, ἀποδοῦναι, ὅτι ἡ ποσποσμοῖς. "It is another medication for herpes, carbuncles, callouses, and cracks of the skin, and it

20) Aëtius Amidenus I-VIII, CMG VIII (Leipzig, 1935-1950) ed. A.Olivieri: XV, Athena 21 (1909) 3-144, ed. S.Zerbo.

21) Cf. A verso, 7-10 ποσποσμοῖς καὶ πύργον. Cf. also A verso, 10-11 ποσποσμοῖς καὶ πύργον and A, 4-5 ἐλκυσ καὶ πύργον.

22) I owe this reference, with many thanks, to Prof. J.Arthur Hanson who sent me a list of all the references for the word πυρρῶν which are to be found in the computerized books of Galen available at Princeton. They are: II 703, XII 325, 467, XIII 399, 455, 951-2, 959, XVIII B 598.

23) CMG IX (Leipzig, 1921-1924) ed. I.L.Heiberg.

24) A is omitted in the printed text, but the app.crit. gives the MS evidence: τὸ D: A τὸ ABEDM: A τὸ I = τὸ FGK. Cf. Orib.Eupor. IV 124 τὸ πύργον (= τὸ πύργον), 130 τὸ ἐλκυσ ποσποσμοῖς. And cf. B verso, 6 in our codex.

25) For ὁμοῦ καὶ ἀποδοῦναι see A verso, 8, and cf. note to lines 2-4, above, ad fin.

very much reduces inflammation, according to Heras the Cappadocian."

Another of the parygron parallel texts, Aët. XV, p.127, is called ἄλλη παρηγορητικὴ²⁶⁾ ὀρίβασίου πρὸς τὰ αὐτόματα ἔλκεα καὶ τοὺς τρυφερὸχρωτας, "another soothing medication of Oribasius for spontaneous sores and tender skin."²⁷⁾ After the ingredients is the following: ποτεῖ καὶ πρὸς ἔρπητας καὶ πρὸς τὰ ἐν μήτρῳ καὶ δακτυλῶν ἀνελεῖν ῥοδία, καὶ πρὸς τὰ κακοήθη ἐν προσώπῳ πυδράκια. "It is effective against herpes and ulcers in the womb and anus, when diluted with rose oil, and against virulent pustules on the face."²⁸⁾ The recipe in Paul. VII 17.27 is called πᾶνυρον ὀρίβασίου. It differs from the others in that it adds three more ingredients.²⁹⁾ which may account for the cautionary admonition: θαυμασίως ποτεῖ πρὸς κίτρινον ἀγιάδας, ἐπὶ ἔλκεσιν δὲ, φρεσὶ, φυλάττω· θυμῶδες γὰρ ἀποτελεῖται, "it works wonderfully for cracks of the heels, but for ulcers, he says, be careful, for the medication will turn rancid in time."

5. δαμιοπόσιον: for other plasters of Heras which are described as ποτεῖ δαμνοῖον, cf. Gal. XIII 547.15: 786.12.

καὶ ἄλλοι: so. διαθήκων. Cf. Aët. XV, p.60.15 ποτεῖ καὶ πρὸς ἐρυσιπύλας καὶ ἄλλας κλίσεις διαθήκας.

6. A horizontal break through this line has caused considerable loss and damage, so that the only securely read letters are γ and ο. The line could not have been read, nor indeed parts of lines 12-15, without the parallel text of Gal. XIII 951-53, where the parygron of Heras is described at length.

[ἐὰν γὰρ καὶ εὐμαίῃ: Galen has (952.3) ἴσται γὰρ τοῦτο βραχέως εἰς φλεγμονὴν ἔχον τὸ μέρος, οὗ μετὰ πολλὸν χρόνον τῆς ἐκτετασίας, ἀλλ' εὐθέως ἐκτείνεται. "For this remedy heals the portion of the body which has a minor inflammation, not after a long time of preparation, but immediately upon application."

6-7. τῷ παύριον λεγόμενον: The name of the plaster is guaranteed by the four ingredients of the recipe which appear also in Gal. XIII 953 in the same order and with the same amounts, but in ounces instead of drachms, and with the same concluding direction. See the Table of Ingredients and Amounts at the end of the commentary. The name is found both as τὸ πᾶνυρον and ἡ πᾶνυρος. Occasionally, τὸ πᾶνυρον and ἡ πᾶνυρος are found in error for πᾶνυρον, πᾶνυρος. In Orib.Eupor. IV 124 (= V 786) is the title τὸ πᾶνυρον,

26) Of six MSS four have παρηγορητικὴ or variant, one has πᾶνυρος and the last, πᾶνυρος. For the ingredients and amounts as those of the parygron, see the Table at the end of the commentary.

27) Orib. Fr. 102 I = IV 615, 15-16 in Oribasius, Œuvres I-VI (Paris, 1851-1876) ed. Bussemaker and Daremberg) has the following: πρὸς τὰ αὐτόματα. ἀρχὴ πᾶνυρος πρὸς τοὺς τρυφερὸχρωτας.

28) Orib. Fr. 102: ποτεῖ ἐπὶ γυναικείων σπλάτων καὶ πρὸς ἔρπητας· ἐπεὶ δὲ καὶ δακτυλικὴ ἀνελεῖται καὶ πρὸς τὰ περὶ μήτρας, εἰ δὲ πρὸς γινεθλας κακοήθεις καὶ τὰ περὶ ποδῶν πυδράκια.

29) 9 oz. of resin, 10 oz. each of linseed juice and oil.

but the ingredients and amounts and direction are exactly the same as in the parygron recipe of Galen XIII 953. In Orib.fr. 102 (= IV 615,15) the recipe is called *λευκή πάργυρος*.

In Aët. XV, p.80, the parallel parygron recipe is entitled *ἡ πάργυρος*, with no conflicting variants in the MSS. But p.46 has a recipe called *ἡ 5: ὑπελαίου*, at the end of which is the following: τοῦτο λέγεται οὕτως (ἡ λέξις ἀποδίδεται, ἐπ' αὐτῇ ἡ πάργυρος ἀνομαζομένη καὶ αἱ τρεῖς τὰς παραλήψεις (sc. γόμμηκαί, with the evidence of the MSS given as πάργυρος LW, πάργυρος MΘ. Since the recipe is composed of 1 lb. of litharge and 2 lbs. each of oil and water, there is reason for it to be called a parygros, a quite moist medication, rather than a paryeros, a somewhat moist medication. This is true also of the recipe on p.126, entitled τὸ πάργυρον γαλvanoῦ, ἄλλω τὸ παρήγορον καλοῦμενον.³⁰⁾ The recipe was taken from Gal. XIII 424-5 where the same ingredients with the same amounts are found, and the words παρήγορον and ἀνώδυνον are used to describe it. It is quite different from the parygron: there is no wax; and pig fat, the largest item in the parygron, is here the smallest = one-half part; there is one part each of white lead and litharge; and two parts each of oil and water.

7-8. μὴ καταφρονεῖς τὴν φαρμάκην: "a medication not to be despised." The adjective *μὴ* seemingly quite infrequent (cf. LSJ, s.v.). The verb is used by Alexander Trallianus (II 349)³¹⁾ in connection with a recipe: ἱερπὸν δὲ τὸ βοηθῆσαι καὶ μὴ καταφρονεῖς διὰ τὸ εὐχελεῖ τὴν εἰσόδον. "it is a powerful remedy, and you should not despise it because of the cheapness of its ingredients." Cf. Aët. XV, p.98, where another recipe for a plaster, which contains only litharge, arsenic, and oil, is concluded by the following: αὕτη πάρα καλὴ καὶ μὴ καταφρονεῖς τὴν εὐχελεῖαν. "This is an altogether excellent application. Do not despise it because of its inexpensiveness."

8-9. αἰθέριος ὑπελαίου ποσότητος ὁ φάρμακον (ἀεοῦγγιον): the other parygron recipes have αἰθέριος ποσότητος ὑπελαίου ἑξινεισμένου (fibresless) Gal. XIII 953. Aët. XV, p.80, Orib.Eupor. IV 124; c.ό.π. Gal. XIII 532; πικρὰς ὑπελαίου ποσότητος Orib.fr. 102; π. χολερίας πο. Aët. XV, p.127; λίανος ὑπελαίου Paul. VII 17,27.

(ἀεοῦγγιον) = Lat. *axungia*, animal fat, usually pig fat (cf. the New Oxford Latin Dictionary, s.v.), often spelled ἀεῦγγιον in Dsc., Orib., and Paul.³²⁾ In a recipe for a plaster of Galen, called *ἡ φαρμακία*³³⁾ for cicatrizing ulcers, a recipe similar to the parygron except for the omission of wax, the

30) Prof. J.Arthur Hanson has checked the computerized books of Galen, available at Princeton, and found no example of πάργυρον, -ος.

31) Opera, vols. I-II (Amsterdam, 1963) ed. Th.Fuschmann.

32) E.g., Dsc. III 90; Dsc.Eupor. I 145, 173, 215, et al.; Orib. Fr. 97; Paul. VII 17.9, 20, 21, et al. (but one MS, R, has the spelling ἀεοῦγγιον throughout).

33) Gal. XIII 375ff.; 391,12. See also F. 10 in our codex.

fat is described as follows: τοῦ παλαιῦ στίβου ἡ καλοῦσα ἄξουγγιον οἱ τιποδονοῦντες ἐπεὶ αὖτις αἴσται 3, "2 lbs. of old fat: let it be that which those selling it call axunge" (378,4). In a repetition of the recipe (391,12) he repeats the description: καὶ δύο τοῦ παλαιῦ στίβου, ἡ καλεῖται ἐπεὶ τοῦ τιποδονοῦντος ἄξουγγιον. He had earlier (376) specified that the στίβος was τῶν δύν, and ἐπεὶ δὲ τὸ στίβος ἀναλῶν τε καὶ ἐν ἐνὶ ἀλάστοι παλαιότατον εἶναι, "the fat must be unsalted and especially it is to be as old as possible."³⁴

Most of the instances of the word ἄξουγγιον in the recipes of Dioscorides, Galen, Aëtius and Paulus are without modification, or with παλαιόν only. But two recipes in Aët. XV, p.88,13 and 102,4 require ἄξουγγιον νεώτερον, which is the equivalent of our νεωτέρου. A closer parallel is found in a recipe for a plaster of Dioscorides (taken from a collection by Menecrates) which was put into metre for easy memory: Τοῦ λευκοῦ καὶ νεωτέρου ἄξουγγιον, ἑννέα δὲ τοῦ χερσίνου, ὁ γνησίον, βάλανον (Gal. XIII 1002, 6-7), "but in winter, as he said, add nine pounds of oily, fresh axunge."

8-11. For a discussion of white plasters, those containing white wax, litharge, and white lead, see Gal. XIII 409ff.; on the various kinds of wax, 411; on the addition of fat, 424ff. For a comparison of the amounts of the ingredients in our text with those in the parallel texts, see the Table at the end of the commentary. In general, the amounts of the two metals are the same; the amount of wax is four times that of the metals; and the amount of fat is nearly double that of the wax.

9. (δρ.) κ (τίτατρον): Our scribe was indeed careless in writing this line. Not only did he omit the word ἄξουγγιον, but he wrote the symbol for one-fourth in place of four. (See the app. crit.) The Table of Ingredients and Amounts shows clearly that (δρ.) κδ is required here.

10. [λευκὸν λευκόν]: Of the parallel recipes in the Table, the two Galen texts are the only ones which specify white wax.

(δρ.) κ (τίτατρον): (δρ.) κδ is required here. Cf. note to line 9, 6 and the symbol for τίτατρον are easily confused.

ψευδίου: this is the regular papyrus spelling for ψευδίον. Cf. M.-H. Marganne, *Inventaire Analytique des Papyrus Grecs de Médecine*, p.373, s.v. ψευδίον, where only one of the eight references, P.Ryl. I 29a,41, is given the restored spelling ψευδίον. But see now *MPER N.S. XIII*, Index, p.56: of the 3 references there given, one has the spelling ψευδίον (No. 6, 9; Tafel 4).

11ff. τὰ τρεῖς κ[ατὰ] τῶν [ἐπιδ]ω: "add the melted ingredients to the dried, powdered ingredients." See 21 B verso, 12 and note ad loc. But the direction in A adds three more words, καὶ ὅτι δὲ συνίσταται (read -ται),

34) For the same composition recipe, Paul. VII 17,29 has ὄξουγγιον παλαιόν; Orib.Syn. III 5 has κομμένην παλαιόν καὶ ἀνάλου στίβου; while Aët. XV, p.44 has the same but adds τρεῖς (already melted). In the directions, however, the item is referred to as τοῦ ὄξουγγιον.

"and allow to stand for a time."³⁵⁾ The three words could not have been read without the parallel in Gal. XIII 953, which has the same direction. It is also repeated in exactly the same form in Orib.Eupor. IV 124, Orib.Fr. 102 has simply τὰ τρατὰ κατὰ τὸν ἑνοῦν; Aët. XV, p.127 has τὰ τρατὰ ἀναμίχυνε κατὰ τὸν ἑνοῦν. While Aët. XV, p.80 has an expanded form: τὰ τρατὰ κατὰ τὸν ἑνοῦν ἀνέμειξε, ἐπαύριστα δὲ λίβε. ἐν ὑπόλοιπῳ τινὶ καὶ οὖν κατὰ πρᾶξιν τὸν ὑπερῶν λαμβάνει. "Mix together the melted ingredients with the dried ingredients. It will remain quite watery for a time but will shortly take on consistency."

13. οὐτὴ [δ]ταρ σιόμεναι: the text may have had [δ]ταρ = δῖται, since the space of the lacuna, in the line above, is occupied by 3 letters, [δ]ου. Cf. 12-13, συν[δ]ταρ = συνδῖται.

13-16. For the restoration of Gal. XIII 399-400 ποδὲνιον δ' ὅτι κνέμασι καὶ ἀποσώμασι καὶ συνελόντι φάναι μικροῖς ἐκτετατοῖς δουρίαι. τὸ τοιοῦτον φάρμακον, ἐφ' ὧν καὶ ἡ πάσχυρος ἐνομαζομένη κνέμα καὶ ἄλλα τινὲς δουραὶ κοινωτέραι τῶν ἱσχυρῶν δύναμις ἐχέτω· εἰσὶν, ἀποτὰ τοῖς μεγάλαις τραύματιν ἐπιτίθενται. "It is clear that such a medication is suitable for bites and abrasions and, in a word, minor wounds. Among such medications are the cerate called paryqros and some other similar preparations which are more useful than those having a strong curative property, such as the kind we apply to large wounds."

Table of Ingredients and Amounts

	Mich. Inv. 21 A	Gal. XIII 953	Gal. XIII 952	Orib. Eup. IV 124	Orib. Fr. 102	Aët. XV p.80	Aët. XV p.127	Paul. VII 17,27
pig fat	44 dr. ³⁶⁾	44	88 dr.	44 ³⁸⁾	11	44	11	7
wax	24 dr. ³⁷⁾	24	48 dr.	24	6	24	6	4
white lead	6 dr.	6	12 dr.	6	1½	6	1½	1½
litharge	6 dr.	6	12 dr.	6	1½	6	1½	1½

The amounts are in ounces except where otherwise stated. Orib. Fr. 90,32 called ἱσχυρὸν κνέμαρον, and the last recipe in Fr. 90, called simply κνέμαρον, are omitted because they are both more properly κνέμαρον. Cf. note to lines 6-7, above.

³⁵⁾ "Stand together" is the basic meaning of συνδῖται but see LSJ, s.v., V, for the meanings "make firm, contract, condense," i.e., in a medicated plaster, "take on consistency."

³⁶⁾ See the note to line 9, above.

³⁷⁾ See the note to line 10, above.

³⁸⁾ The printed text has κδ = 24, a typographical error for κδ = 44, as shown by the Latin translation "quadraginta quattuor" at the foot of the page. The edition has no app.crit. for comparison of MSS readings.

container, use as previously directed." In XIV 409, 1-2, one of the common home remedies for untoward eye conditions is the following: ἄλλο' ἐκ τοῦ κηράνου προσφάτου χυλὸν ἐκπιέσας τίθει ἐν τῇ πυξίδι τοῦ χαλκοῦ ἐπίθρου καὶ χρῶ. "Another remedy: express the juice from fresh-picked rue and store it in a receptacle of red copper."

The writer of the codex placed a large dot after πυξίδα to mark the end of the recipe. In addition he placed a broken line beneath line 4, which he extruded into the margin. Then, after leaving a blank space of one line, he indented the two following lines by 4 letter-spaces to mark them off as a general title for the next section.

5. ἐμψια φάρμακα: medications treated with tents or tampons for dressing wounds. Cf. Gal. XI 125,15 εἶναι δὲ γὰρ τὰ τεκόμενα φάρμακα δριμύτερά τῶν ἐμψιων ὀνομαζομένων, "it is necessary for dissolved and very pungent drugs to be upon so-called pledgets." Paul. IV 40.3 διακρίτεον δὲ ποσῶς, τὰ τε κεφαλικά προσεγορευόμενα ἐμψια, ἐμψια δὲ φάρμακα ἃ τε τροφὸς ἴσται καλούμενη καὶ ἡ Ἴσις καὶ ἡ Ἀθηνᾶ, "when the ulcers are more foul the powders called cephalic are to be applied and the medications upon pledgets, the so-called Trophos, the Isis, and the Athena."

6. ἄνα = ἀνη. For the comparatively rare interchange of η and α, cf. Mayser-Schmoll, I 1, 54.

πρὸς ἔλκη: for wounds, ulcers, or sores. Cf. Hipp. περί ἔλκων (ed. Littre, vol. VI 460-432). In the thirteen fragments of our codex, nine of the texts mention ἔλκη. Cf. note to A, 5ff.

7, margin. On the edge of the papyrus opposite this line is a very black curved stroke, not an antisigma, in the second hand. It was undoubtedly intended to draw attention to the first recipe in the new section. For marginal symbols in this codex see H, 8-10 and M, 5-10.

7. ἐμψιον ὑγρόν: sc. φάρμακον. "A moist medication upon pledgets" is the beginning of the title of the next recipe which continues beyond the broken-off bottom of the text.⁴¹⁾ For an ἐμψιον καλλίστη ὑγρὰ, sc. ἐμψιακτόν, cf. Dsc. Eupor. I 173. Cf. also D, 10 of our codex, ἑστὴ ἐμψιον, sc. ἐμψιακτόν, "a refined tented plaster."

πρὸς νοσή: κτλ.: There are many recipes in the works of the medical writers for plasters which are suitable for a number of various types of ulcers and ulcerous conditions. Cf. Gal. XIII 766,15 πανάκεια ἥκοι ... πρὸς πᾶσαν νοσὴν καὶ κακοήθειαν, "the panacea of Heras against every kind of spreading and malignant ulcer;" 836,17 πρὸς νοσή, κύσιν, πτερυγία, ... ἐρπητας, ἐρυσιπέλας καὶ ἄλλα, "for spreading ulcers, abscesses, fleshy excrescences, herpes, erysipelas, and other conditions;" Aët. XV, p. 110,23 μάλιστα ἐπὶ τῶν χρόνιων τῶν καὶ δυσπεποικωμένων καὶ σπυγδαλέων καὶ νοσῶν ἑλκῶν, "especially for the oldest, hard to cicatrize, septic, and spreading ulcers." Cf. also Paul. IV 43,3; 44,1-5.

⁴¹⁾ Cf. A, note to lines 2-4, ad fin., for the suggestion that A verso preceded A in the codex.

8-9. Herpes, often called shingles, is characterized by painful inflamed clusters of small pustules and is frequently found in conjunction with ἀνθράκας and ἐρυσίπελας. The former are carbuncles or malignant pustules, caused by inflamed subcutaneous tissues, often occurring on the neck. The latter, erysipelas, is an acute, painful inflammation of the skin and mucous membranes; on this disease see Celsus, Loeb ed., vol. III, p. 590. For ἀνθράκες see Gal. XIII 854ff. for all three conditions, cf. a cerate-recipe in Gal. XI 439,11: καὶ οὖν τοῦτο πρὸς ἐρυσίπελας καὶ πλεγματὶς ἐρπητὶς τε καὶ ἀνθράκας ἀναδόν ἐστὶν φάρμακον. Cf. also VII 719; XIII 533, 684, 835-7; Dsc. Eupor. I 160, 161; Orib. Syn. VII 12, 32, 33; Paul. IV 20, 21, 25. For papyri cf. PSI X 1180, 56-57, πρὸς ἐρυσίπελας⁴²⁾ μετ' ἰδαίου, πρὸς ἐρπητὶν καὶ μετ' οἶνου Αἰγυπτίου.

9-10. νεύρων ὁ[ρ]ήματα: ruptures of tendons. Cf. Gal. XIII 645, 15 κίρρα ἢ τοῦ 'Αλκίμαχου ποιεῖ πρὸς τὰ ἐγκατα τῶν τραυμάτων καὶ νεύρων διακοπήν ποιεῖ δὲ καὶ πρὸς τὰ παλαιὰ καὶ δυσπεπρωμένα καὶ δευματικὰ τῶν ἔλκων, "the yellow plaster of Haliacus: it works for the bloodclots of wounds and ruptures of tendons; it is effective against old, hard to cicatrize, and discharging ulcers;"⁴³⁾ XIII 778, 11 (εἰς τὴν ἑν Μήμφοι 'Ηρακλείου' ποιεῖ ἐπὶ προσώτων ἐκείνων, δευματικῶν, πρὸς νεύρων διακοπήν, παλαιὰ ἔλκη, ..., σηπιδόνας, ἀνθράκας, "the sacred plaster from the Heracleion in Memphis: it is good for fresh bleeding, discharges, for ruptured tendons, long-standing ulcers, septic ulcers, carbuncles."

10-11. βυταρά ἔλκη: foul or filthy wounds or ulcers. Cf. Gal. XII 682-3, ποιεῖ δὲ καὶ πρὸς νεκρὰ καὶ σηπιδόνας ἐπιμαρτυρεῖν καὶ πρὸς τὰ βυταρά ἔλκη, ἐν ποτῇ μετὰ μέλιτος. "The remedy is effective against spreading and septic ulcers when sprinkled on, and against foul ulcers when applied on a lint pledget with honey." Aët. XV, p. 19.9 αὕτη πολλὰν τραύματα μεγάλα δύναται καὶ τὰ βυταρά ἔλκη ἀνακαθαρίσκειν καὶ τὰ παχύτερα τῶν ἔλκων ἰσθῆναι καὶ προτελλεῖν κόλπους καὶ ὅλως διαρροεῖν καὶ ἀπορροεσθαι δύναται. "This remedy is able to agglutinate large wounds, to thoroughly clean filthy ulcers, to heal massive ulcerations, and to draw in, disperse, and wholly drive out fistulous ulcers." Cf. also Paul. III 79,6 πρὸς τὰ ἐν τῇ κλίματι βυταρά ἔλκη ἐμυστον; IV 41 ἀνακαθαρίσκειν βυταρῶν ἔλκων; VII 17,40 ἢ 'Αθηνὰ πρὸς ἔλκη βυταρά κτλ.

11-12. ὁ[ρ]έα χόνδρου πελιδνά: "bones bare of cartilage" are "exposed bones", due to wounds or other physical damage. Cf. Aët. XV, p. 41,5, "the highly esteemed and very useful plaster of Machaerion": ποιεῖ καὶ πρὸς νεκρὰ ... ἐπὶ τε τῶν ἐφελκυσμένων ὁ[ρ]έων σώματος αὐξοῦσα, "it is good for spreading ulcers, ... and for bones laid bare, by encouraging growth of flesh." Cf.

42) Ed.pr. ἐρυσίπελας. In the medical writers the word is usually found in the plural.

43) Aët. XV, p.48, has the same recipe of Haliacus.

also Gal. XIII 557, "the Barbaros plaster of Heras": ... πρὸς σφουγγας, κόλ-
ηους, κατὰφυλας, ... ποιεῖ καὶ ἐνι νεύρων καὶ χόνδρων διατεκνονέων καὶ
ἄσθμων, "for abscesses, fistulous ulcers, and fractures, ... it is effective
also for ruptures of tendons, cartilage, and bones."⁴⁴)

12. κόλη(η)ους: fistulous ulcers which spread under the skin. Cf. Gal. XI
125 for a definition. The word is found again in our codex in B, 6 and B
verso, 4.

κατὰφυλας: For this word following κόληους see note to lines 11-12, above.
For its occurrence in papyri see Marganne, *Inventaire Analytique*, p. 214. It
may occur again in our codex in B verso, 5.

P. Mich. inv. 21 B

7 x 8,7 cm.

Plate 2a

1. ἄσθμων ὁ ὅς ἐστιν ἡ ἀσθενία (ἀσθενία)
[ποῖ δὲ καὶ] πρὸς κόλη(η)ους καὶ χόνδρων
4 [καὶ] τῶν ἐνι νεύρων καὶ χόνδρων
[καὶ] τῶν ἐνι νεύρων καὶ χόνδρων
[καὶ] τῶν ἐνι νεύρων καὶ χόνδρων
[καὶ] τῶν ἐνι νεύρων καὶ χόνδρων
5 [καὶ] τῶν ἐνι νεύρων καὶ χόνδρων
[καὶ] τῶν ἐνι νεύρων καὶ χόνδρων
[καὶ] τῶν ἐνι νεύρων καὶ χόνδρων
12 [καὶ] τῶν ἐνι νεύρων καὶ χόνδρων
[καὶ] τῶν ἐνι νεύρων καὶ χόνδρων
[καὶ] τῶν ἐνι νεύρων καὶ χόνδρων

3, 5. ποιεῖ 8. ἀσθενία 9. σφουγγας 10. κόλη 11. κατὰφυλας
12. χόνδρων

Translation

Azanites has the following: It works for all malignant sores; it is a
highly esteemed application. It is effective against fistulous ulcers re-
sulting from the surgical incision made in a lithotomy, and against those
ulcers resulting from multiple incisions of great length in operations for
fractures. 1 oz. of pitch, 2 oz. each of wax and oesypum (grease of sheep's
wool), 6 oz. each of pig-fat and bull-fat, 5 oz. of pine-resin. When it is
for ulcers, use more of the medication; when it is for cicatrizing, less.

2. ἡ ἀσθενία: For omission of other letters in this text see lines 12-13.
See also omission of letters or words in A, 9; B verso, 8; D, 4, 12, 13 note;

⁴⁴) Aët. XV, p. 53, has the same Barbaros plaster of Heras. I am grateful
to Ann Ellis Hanson for sending me a computer printout of all the references
for the word χόνδρος from the whole of Galen.

E verso, 11; et al.

2-4. The supplements are illustrative, but the traces of ink fit the restored letters. Galen, XIII: 784-5, has ἡ τοῦ Ἀζανίτου πολύχρηστος ἐστὶ καὶ ἐνδοξος, περὶ αὐτῆς δὲ γράφει ὁ Ἡράκλειτος ὅτι ἡ τοῦ Ἀζανίτου, κτλ. "The plaster of Azanites has many uses and is highly esteemed. Concerning it Heras writes thus: 'The plaster of Azanites, etc.'" Aëtius XV, p. 123, has ἡ τοῦ Ἀζανίτου (Ἀζανίτου, Ἀζανίου)⁴⁵ πολύχρηστος τε καὶ ἐνδοξος. Paulus VII 19.6 has only τὸ τοῦ Ἀζανίτου (sc. φάρμακον), or δάκρυον from the heading of Chap. 19, "a relieving application"; and Oribasius, Frag. 90, ἡ τοῦ Ἀζανίτου (sc. ἐπιπλαστρού).

3ff. Both Galen (785) and Aëtius (p. 123) have the following, with unimportant variations: ποιεῖ καὶ τὰ κακοῦσθαι πάντα, γαγγραινας, κίσθινας, πρὸς οὖρα τραύματα, πυθίματα, περιουγκούς, ... καὶ πρὸς τὰ ἐν ὑτέρῳ ἔλκη, ὕματα, παρωτίδας, ... μάλιστα δὲ ποιεῖ ἐν ᾧ ἡ πληγὴ περὶ τὰ νεύρα ἢ μὲν ἐστὶ καὶ ἐν κακοῦσθαι. "The medication is effective in all cases of malignant sores, gangrene, abscesses, fresh wounds, ulcers caused by fire or by frost, ... and for ulcers in the womb, tumors in general, and parotid tumors, ... It works especially well in cases where there is a wound⁴⁶ of the tendons or a muscle, and it is good in cases of malignant ulcers."

5. [ἐπιπλάστρον]: Galen has (785, 9-10) ποιεῖ καὶ ... ἐπιπλάστρον (sc. ἐπιπλαστρού). With the neuter, sc. φάρμακον or δάκρυον (cf. Paulus, in note 2-4, above).

6-8. The uses which are described in these lines, i.e. for fistulous ulcers resulting from a lithotomy or those from the lengthy, multiple incisions necessary in fracture-operations, are not specifically mentioned by either Galen or Aëtius in connection with the plaster of Azanites. (Cf. note to lines 3ff., above.) Oribasius, however, especially recommends the applications called "the tetrapharmakon, that of Azanites, and the Macedonicon," for treating the wounds left after the excision of corruption, and for inflammations complicated by spreading ulcers (III 561, 563).⁴⁷

6. [κόλη]ου: for κόλη as a fistulous ulcer which spreads under the skin, see LSJ, s.v. III 6. The ailment is found many times in Galen and an agglutinant plaster is the treatment prescribed. Cf. e.g. that called ἡ Ἰνδὸς of Ἐπίγονος (XIII 774), another πολύχρηστον φάρμακον, which cites many of the same uses as those listed in the note to lines 3ff., above. Cf. also Orib. III 591; Aët. XV, p. 113, 13-17; Paul. VII 17.44. κόληου is found again in our codex in A verso, 12 and B verso, 4.

45) Ἀζανίτου, two MSS; Ἀζανίου, two other MSS.

46) In view of the context, πληγὴ must here indicate a "wound", as in modern Greek, rather than a "blow" or "strike", although the wound may well have been caused by a blow or strike. See also LSJ, s.v. οὐλή, for "scars" from πληγὴν as well as τραυμάτων.

47) The three recipes referred to are found in Orib. Frag. No. 90 (IV 608).

λιθοτομία: the surgical operation for removing stones, either from the bladder (κλῆτις) or the kidneys (νεφροί). Cf. Paul. VI 60.

7-8. ἐπὶ μεγάλων ἐπιθεσίσεων (-διαί-): "long multiple incisions." Also possible is μετ' ἐξῶν ἐ., "multiple incisions of very great length." Cf. Orib. III 575,3 with respect to ἀποστήματα, "abscesses," which are frequently linked with κόλποι.⁴⁸⁾ πάλιν ἐπὶ μὲν τῶν μικρῶν ἀποστημάτων μὴ διατρέπει κανονεῖα, ... ἐπὶ δὲ τῶν μεγάλων πλείοσι διατρέπει κανονεῖα. "When the abscesses are small we use only one incision, ... but for those of greater size we use multiple incisions." Cf. also III 570,9: τὰς δὲ περὶ ἀπέσεις τὸν αὐτὸν τρόπον θεραπεύομεν καὶ τὰς μεγάλας διατρέπειν, "we treat in the same way wounds resulting from surgical excisions and those resulting from incisions of great length."

8. ῥαγῶν: "fractures." The possible alternative, ῥαγῶν, "fissures", is exceedingly rare (cf. Stephanus, TGL, s.v. ῥαγῆ) and is not likely to have occurred in the present text. For ῥαγῆ see Gal. XIX 431-2 where, in sections 316-324, the several different kinds of bone fractures in the head are defined. Definition 317 has ῥαγῆ ἐστὶν ὁτιοῦ διακονῆ ἐπικόλλας τῷδε καὶ ἥτοι στῆν ἢ πλατῆ, "a rhagme is a cleft of the bone, superficial and straight and either narrow or wide." Paul. VI 90,1 has ῥαγῆ μὲν οὖν ἐστὶ διαίρεσις τοῦ κρανίου ἐπικόλλας ἢ βαθύς καὶ ὡς εἴη μετακινηθέντος τοῦ περὶ τοῦ ὁτιοῦ, "a rhagme is a division of the cranium-bone, superficial or deep, when the affected bone has in no wise been shifted outward." Soranus, CMG IV 155,2 has ῥαγῆ μὲν οὖν ἐστὶν ἀπλῆ δὴ εἴς ὅτιον παραλήπτα ταῖς δομῆσιν ἐπὶ τῶν ὀστέων κρυπτῶν ..., "a rhagme is a simple break of the bone resembling those seen in small, stone vessels ..." Cf. Hipp. περὶ ἀκμῶν I (VI 400) where he warns that there is risk of ulcers and inflammation in any part of the body in which a fracture has occurred.

9-12. See the Table of Ingredients and Amounts at the end of the commentary.

9. πίσσα, pitch, was a common ingredient in many preparations described by the ancient medical writers. For its occurrence in recipes on papyrus see Marganne, p. 367-8. In the Azanites recipe, Galen and Oribasius specify πίσσα ξηρά, "dried pitch," as does also one of the MSS of Aëtius, whereas Paulus substitutes καλβάνο, the resinous juice of all-heal.

κηρός, bees-wax, was a prime ingredient of many plasters, particularly those prescribed for wounds, ulcers, abscesses, etc. For its occurrence in other papyri, see Marganne, p. 362.

ὀϊότου = οἰότου. The word is restored from the parallel texts of Galen, Oribasius, and Paulus. See Dsc. II 74 for the definition of οἰότος as τὸ ἐκ τῶν οἰοτροῶν ἐοικὼς λίπος, "the fat from grease-containing wool," and the several methods for extracting it. See also Paul. VII 17.88 ὑποὸ οἰότου τοῦ κομμάκου κηρός, "the preparation of the medicament, moist wool-grease."

48) E.g. Aët. XV, p. 90, 5-7; 91, 12-13; 93, 16-17; 113, 16-17.

The new Oxford Latin Dictionary (ed. P.G.W. Glare, 1982) has "oesypum, sometimes written oesopum (fr. Gr. οἶσπον). The grease obtained from unwashed wool (used in medicine, as a cosmetic, etc.)."⁴⁹⁾

The Azanites text of Paulus (VII 19.6) has οἶσπον οὐλοῦνον, "the medicament, oesypum": but four of the MSS of Paulus have the spelling οἶσπον, while four other MSS have ὀἶσπον = hyssop.⁵⁰⁾ Hyssop, an herbal plant, is of course out of the question in this recipe and the word should have been punctuated ὀἶσπον = οἶσπον. The interchange of ο. and υ is extremely common. Cf. Gignac, Grammar, I 197, "This is the most frequent interchange in the papyri next to the interchanges of α. with ι and α. with ε." For the interchange of υ and ω, see Gignac, Grammar, I 293-4, and note that the Latin word is found with the same interchange. A double consonant, in place of a single consonant, and vice versa, is common enough to need no remark, although in the present instance it was undoubtedly caused by the similarity of sounds between οἶσπον and ὀἶσπον.⁵¹⁾

The Azanites text of Aëtius has ὀἶσπον, with no recorded variants in the MSS, but the presence of the short direction at the end of the recipe, τήλας κοῦ, "melt the ingredients together and use," shows that the ingredients must all be τήλα, i.e. soluble ingredients. Hyssop is a plant or small shrub, and would be among the dried ingredients in the familiar brief direction, τὰ τήλα κατὰ τὸν ἔλεον, "add the melted ingredients to the dried ingredients."⁵²⁾ We must therefore read in the Aëtius text ὀἶσπον = οἶσπον.

10-11. εἰκότα: ὕλειον καὶ ταυρίον: Cf. D, 4 for the spelling ὕλειον, and A, 8-9 for ὕλειον. The Galen text of the recipe has the same two fats, that of swine and of bulls, but only half the amount of each, i.e. 3 oz. instead of 6 oz. The Aëtius recipe has the same two again, but specifies that the pig fat should be old and pure (παλαιὸν καθαρὸν) and there should be 6 oz. of it to 1 oz. of bull fat. The recipe of Paulus calls for the same ratio of pig fat to bull fat (24 oz. to 12 oz.), but ταυρίον is substituted for ὕλειον, i.e. fat of young pig rather than full-grown pig. Oribasius calls for an amount of pig fat four times that of bull fat, i.e. 12 oz. to 3 oz. and requires the pig fat to be melted separately (τεταμένον ὕλειον ὑπερθεῖον).

11-12. νεκρίων (οὐ) ε: ε is restored from Galen and Aëtius, whose amounts in general are comparable to those in 21 B. But Galen has ἄντριον νεκρίων; Oribasius has νεκρίων ἄντριον 4 νεκρίων; and Aëtius, αἰνέλιον 4 νεκρίων; while Paulus has ἄντριον καὶ ὀἶσπον.

49) Cf. Webster's Third New International Dictionary, 1971, s.v. lanolin: "wool grease refined for use chiefly in ointments and cosmetics; ... it is much used as a basis for ointments."

50) For the confusion of οἶσπον with ὀἶσπον among the ancient writers, see Stephanus, TGL, s.v. ὀἶσπον.

51) Cf. LSJ, s.v. ὀἶσπον, for the spelling with one sigma, and likewise Latin hys(s)opum.

52) Cf. A, 11: B verso, 12.

12-14. These lines could not have been read without the parallel in the recipe of Galen (XIII 785, 6f.): $\delta\iota\sigma\tau\alpha\nu\ \kappa\alpha\tau\alpha\ \tau\alpha\ \epsilon\lambda\eta\eta$, $\mu\alpha\lambda\iota\sigma\tau\alpha\nu\ \chi\rho\omega\ \tau\eta\ \sigma\alpha\sigma\mu\acute{\alpha}\nu\eta$, $\delta\iota\sigma\tau\alpha\nu\ \delta\epsilon\ \mu\acute{o}\nu\circ\varsigma\ \epsilon\pi\omicron\upsilon\lambda\alpha\sigma\tau\iota\upsilon$, $\epsilon\lambda\alpha\tau\iota\sigma\tau\alpha\nu$, "when the ulcers are in a cleft, use more of the medication; for cicatrization, use less." Cf. Aëtius XV, p. 123, 11f.

12. $\epsilon\lambda\eta\eta$: the verb is often omitted and may not have been present in the exemplar from which our text was copied.

[$\mu\alpha\lambda\iota\sigma\tau\alpha\nu$ (= $\mu\alpha\lambda\iota\sigma\tau\alpha\nu$) $\kappa\alpha\tau\alpha$]: the first spelling is preferred as the two words require a space equal to that occupied by $\mu\epsilon\lambda\epsilon\iota\sigma\tau\alpha\nu$ in the line above.

Table of Ingredients and Amounts

	21 B	Gal. XIII 784-5	Aët. XV p. 123	Orib. Pr. 90	Paul. VII 19.6
pitch	1	1	1	3	() ⁵³⁾
wax	3	3	3	3	12
wool grease	3	3	3	3	12
pig fat	6	3	6	12	24
bull fat	6	3	3	3	12
pine resin	(5)	5	5	10	12

The amounts in the Table are in ounces. In Paulus the amounts are given in pounds (e.g. pig fat, 2 lbs., bull fat, 1 lb.) and have been converted to ounces.⁵⁴⁾

Inv. 21 B verso

7 x 8,7 cm.

$\delta\epsilon\iota\gamma\mu\alpha\tau\epsilon\varsigma\ (\tau\alpha\ \epsilon\lambda\eta\eta)$

Plate 2b

(Hd. 2, interl.) $\kappa\alpha\tau\alpha\ \epsilon\lambda\eta\eta$

(Hd. 1) $[\kappa\alpha\tau\alpha\ \tau\alpha\ \delta\iota\sigma\tau\alpha\sigma\mu\acute{\alpha}\nu\eta\kappa\alpha\tau\alpha\ \kappa\alpha\tau\alpha]$

$[\tau\alpha\ \mu\alpha\lambda\iota\sigma\tau\alpha\ \kappa\alpha\tau\alpha\ \tau\alpha\ \delta\iota\sigma\tau\alpha\sigma\mu\acute{\alpha}\nu\eta]$

4 $[\tau\iota\kappa\acute{\alpha}\ \kappa\iota\alpha\ \kappa\alpha\tau\alpha\ \delta\iota\sigma\tau\alpha\sigma\mu\acute{\alpha}\nu\eta]$

$[\mu\acute{o}\nu\circ\varsigma\ \lambda\upsilon\mu\alpha\sigma\tau\alpha\ \tau\epsilon\ \tau\alpha\upsilon\tau\alpha\ \tau\alpha\ \epsilon\lambda\eta\eta]$

(Hd. 2, interl.) $\kappa\alpha\tau\alpha\ \epsilon\lambda\eta\eta$

(Hd. 1) $[\delta\iota\sigma\tau\alpha\sigma\mu\acute{\alpha}\nu\eta\ \kappa\alpha\tau\alpha\ \mu\acute{o}\nu\circ\varsigma\ \tau\epsilon\ \tau\alpha\upsilon\tau\alpha\ \tau\alpha\ \epsilon\lambda\eta\eta]$

(Hd. 2, interl.) $\kappa\alpha\tau\alpha\ \epsilon\lambda\eta\eta$

(Hd. 1) $[\lambda\alpha\sigma\tau\alpha\ \kappa\alpha\tau\alpha\ \mu\acute{o}\nu\circ\varsigma\ \tau\epsilon\ \tau\alpha\upsilon\tau\alpha\ \tau\alpha\ \epsilon\lambda\eta\eta]$

8 $[\kappa\alpha\tau\alpha\ \delta\iota\sigma\tau\alpha\sigma\mu\acute{\alpha}\nu\eta\ (\delta\sigma.)\ \kappa\alpha\tau\alpha\ \mu\acute{o}\nu\circ\varsigma\ \tau\epsilon\ \tau\alpha\upsilon\tau\alpha\ \tau\alpha\ \epsilon\lambda\eta\eta]$

$[\kappa\alpha\tau\alpha\ \delta\iota\sigma\tau\alpha\sigma\mu\acute{\alpha}\nu\eta\ (\delta\sigma.)\ \kappa\alpha\tau\alpha\ \mu\acute{o}\nu\circ\varsigma\ \tau\epsilon\ \tau\alpha\upsilon\tau\alpha\ \tau\alpha\ \epsilon\lambda\eta\eta]$

$[\kappa\alpha\tau\alpha\ \delta\iota\sigma\tau\alpha\sigma\mu\acute{\alpha}\nu\eta\ (\delta\sigma.)\ \kappa\alpha\tau\alpha\ \mu\acute{o}\nu\circ\varsigma\ \tau\epsilon\ \tau\alpha\upsilon\tau\alpha\ \tau\alpha\ \epsilon\lambda\eta\eta]$

53) In place of $\kappa\iota\alpha$, Paulus substituted 3 oz. of $\chi\alpha\lambda\beta\acute{\alpha}\nu\eta$, the resinous juice of all-heal.

54) 1 lb. = 12 oz. For convenient tables of weights cf. Gal. XIX 752; Celsus, Loeb ed., vol. II, p. lxx.

(μορσί)νου ἐλαίου κοτύλας 5
 12 τὰ τεκταμένα κατὰ τῶν ἐπαύ(ν)
 (Hd.2, interl.) ^{πῶς}
 (Hd.1) [μοῦτ' καὶ ἔλκε; π[[ρυκ(αυ-
 [τα

5. ἀνταρά 6. ποιοῦσα, c corr. fr. a 8-9. μαρκίωνν κεκαυμένων ποτα-
 μίων 12. pap. ἐπαύ 13 μοῦτ'

Translation

It is a treatment for wounds, wounds that are scarred over, ulcers which are hard to cicatrize, long-standing ulcers, and discharging ulcers; it also heals fistulous ulcers.

A plaster which promotes cicatrization. It is effective against foul ulcers, discharging and chronic ulcers and wounds that are scarred over. 12 drachms of calamine, 8 drachms of burnt river crabs, 5 drachms of white lead, 16 drachms of wax, 6 kotylai of myrtle oil. Add the melted ingredients to the powdered ingredients. It is also good for ulcers caused by burns.

1-4. For these affections, which conclude a preceding recipe, cf. Gal. XIII 527 ἄλλη συμπίλεια λεγόμενη πρὸς τὰς προσημασμένας διαθήσεις καὶ κόλπουσιν παρα-
 κολλῇ καὶ εὐσιγγαῖς ἐκτολῇ. ποιεῖται πρὸς τὰ δερματικά τῶν ἐλκεῶν καὶ πρὸς τὰ
 χρόνια καὶ διαρροήεντα. "Another cicatrizing plaster, that called the Pam-
 philion, for the afore-mentioned conditions, and it unites the edges of
 fistulous ulcers and removes calloused abscesses. It is effective also against
 the discharges of ulcers, against old ulcers, and against those that are
 hard to cicatrize." Cf. also XIII 645, 735ff., 778; Aët. XV, p.48,20ff. For
 a plaster on papyrus (πρὸς τὰ ἡλαστά καὶ θυκα[τούλεια] see P.Aberd. 10,9,⁵⁵)

2. interl. The second hand added [καὶ τὰς] οὐλὰς above the line, which in-
 dicates that the physician-owner collated his codex against an exemplar and
 repaired omissions. See Introduction, ad fin. For other omissions in the text
 see lines 6 and 12. οὐλαί are cicatrices of wounds which have become scarred
 over and which are sometimes painful. Cf. Gal. XIII 346,9 μοῦτ' καὶ πρὸς τὰς
 ἄλλας φλεγμονὰς, καθάρσει καὶ τὰς οὐλὰς πονηρὰς, "it is effective against
 other inflammations, and it cleanses cicatrices which are painful." Dsc.
 Eupor. I 108 οὐλὰς δὲ μελαίναις αἰθερὶ ἐπιχρίοντα, "ointments which raise
 (remove) black cicatrices;" I 109 τὰς δὲ ἐκ λειχήνων οὐλὰς καὶ τὰς ἄλλας δὲ
 δυσχρόους ποιεῖται (δόναντα) ὄνειον στέρκος καταχρίοντον, "an ointment con-
 taining donkey fat is able to make scars from lichen-like skin eruptions of
 a uniform color."

4. Beneath this line are remnants of a broken line followed by a blank
 space of one line to mark the end of the recipe.

⁵⁵) ἡλαστά καὶ θυκα[ed.pr. See plate I in the edition, and cf. Marganne,
 p.33.

5-7. These lines have the title of a new recipe, an ἐπουλωτική, a plaster which promotes cicatrization. Cf. Gal. XIII 522ff., καὶ τῶν ἐπουλωτικῶν, for many similar recipes.

5. Λυγρόα = ῥυγρόα, sc. ἔλκη. For the common interchange of ρ and λ, cf. Mayser-Schmoll, I 1, 161-2; Gignac, Grammar, I, 102-3. Less likely is λυγρόα = λυγρόα (painful ulcers). For the comparatively rare interchange of α and η (except for the well-known ἀνάμια/ἀνέμια) cf. Mayser-Schmoll, I 1, 38, 54; Gignac, I 286. An instance of the word λυγρόα is found in Gal. XIII 1005 λυγροὶ διαθήκεσθαι, "painful conditions." The phrase τὸ ῥυγρόα ἔλκη is extremely frequent. Cf., e.g., Gal. XII 683,1; Orib. Syn. VII 2,1; Aët. XV, p. 39,9; p. 48,6; Paul. I II 79,6; IV 41; VII 17,40; and A verso, 10-11 in our codex.

6. ποσῶα = ποσῶα. For the interchange of α and ο, see Mayser-Schmoll, I 1, 89f.; Gignac, I 197f. Cf. B, 9 ὑ(χ)ῶα = οἰχῶα and note ad loc.

Pap. ποσῶα ^{πρὸς} The second hand is responsible for πρὸς written above the line, ^{ου} The scribe who wrote the codex must have intended originally to include the omitted word since he has ποσῶα on the line, but he abandoned the α without cancelling it and wrote ου beneath it, the start on οὐλῶα. For πρὸςβυτικῶ (sc. ἔλκη) cf. Gal. XIII 731,8 ἐπουλωτικῶν πρὸςβυτικῶν πρὸς δὲ τὰ πρὸςβυτικῶ σκαρίβη καλὸςβου μετὰ ὑπερίωνος κηρωτῆς καὶ. "A plaster for promoting cicatrization of old ulcers. For ulcers of long standing, use slag (dross) of lead with a myrtle oil-cerate." Dsc. Eupor. I 172 πρὸςβυτικῶ δὲ ἀνούαοι ἔλκη ἀνακαλλίει μετὰ κηρωτῆς, "pimpernel, added to a cerate, cicatrizes ulcers of long standing."

7. [[ῥοφῶ]λυγροῦ]: the second hand drew a very black horizontal line through the letters ῥοφ and wrote ροφ above them. ἐπουλωτικός and ἀνούατικός, as well as ἐπουλώα and ἀνούαώα, were used interchangeably by the medical writers (cf. LSJ, s.vv.). ἀνούατικός, on the other hand, is found only in Paulus, e.g. VI 5,26; VII 17,28 and 63, but in each case one or two MSS (D and/or F) have ἀνούα- instead of ἀνούα-. Since ἀνούατικός is also found in Paulus with no diverging MSS, e.g. IV 45, 2 and 4, it is probable that the forms with φ are the work of one or two scribes only and should be regarded as orthographic variants and not true forms. For the interchange of α and φ, cf. Mayser-Schmoll, I 1, 145-6; Gignac, I 87-9. For an ἐπουλωτική on papyrus see P.Aberd. 10. Introduction and line 13 [ἡ ἐπουλω]τική διὰ καδμεία[ς; ⁵⁶] cf. Gal. XIII 524,4.

The large black dot at the end of the line was added by the second hand to set off the title.

8-11. The ingredients of the ἐπουλωτική are found in these lines but unfortunately two of the five are lost except for the final letters, -...c in 8 and -ou in 10, and the name of the oil in 11 is also missing.

56) [γύνη διὰ καδμεία] ed.pr. Cf. Marganne, p.33.

In Gal. XIII, 524-534 are thirty consecutive recipes, all ἐπουλωτικά. In all except one, at least two or three metals are among the ingredients,⁵⁷⁾ and in five of the recipes there are five metals.⁵⁸⁾ It would seem therefore that our two lacunae in lines 8 and 10 ought to have held the names of metals. In the thirty recipes λυδανίου is found most often (25 times); φειθοίου is next with 18 occurrences; καδμείας is found in 7 recipes, as also χαλκίτεως; while στρωτηνείας occurs in 6, χαλκοῦ in 5, and δισκουνοῦ in 4.⁵⁹⁾

8. [καδμείας: also possible is (δισκου)νοῦ and perhaps χαλκί]τεως, στρωτηνείας is too long, for καδμεία cf. Dsc. V 74; Gal. XII 219; and for its occurrence in papyri, Marganne, p. 361. In the introduction to his ἐπουλωτικά, Galen has the following (XIII 523,19): εἰδέναι δὲ καὶ τῶν ἐνδόξων φαρμάκων ὅτι κατὰ πᾶσιν ἐξήντηται, τὸ τε διὰ καδμείας καὶ τὸ διὰ τοῦ λυδανίου φάρμακον ἀποδόντων εἰς ἐπούλωσιν, οὗ κατὰ πᾶσι δὲ τοῖς ἰατροῖς ἡ τῶν αἰγνοημένων ἀλλὰ καὶ φαρμάκων ἀποδόνηται συνέταξις. "It is necessary to know that of the highly esteemed medications which are approved by all physicians, that with calamine and that with iadanum are the best applications for promoting cicatrization. Not agreed upon by all physicians are the proportions of the individual ingredients to be mixed in."

8-9. καρκίνων κα[καυμένων ποταμίων (καρκίνων), nom. for gen.: cf. Dsc. II 10; Gal. XII 356. River crabs are not found in any of the thirty (ἐπουλωτικά) of Galen mentioned above.⁶⁰⁾ The closest parallel to our text which I have been able to locate is that of Archigenes in Paul. IV 26, 4 (= Gal. XIII 731,9ff.):⁶¹⁾ Ἀρχιγένους ποδὲ καρκίνων καὶ κακοῦ ἔλκη. καρκίνων ποταμίων κακαυμένων καὶ καδμείας ἑκα ἑκά ἐνίσταται, ἡ τῶν ποδῶν τῶν καρκίνων μετὰ κηρού τοῦ ἐνίσταται. "The recipes of Archigenes for cancerous and malignant ulcers. Rub to a powder equal parts of burnt river crabs and calamine and sprinkle on. Or, apply (as a plaster) the ashes of the crabs mixed with a cerate." A cerate was essentially a combination of wax and oil, with the addition of resin, fat, or other medicinal ingredients.

Other recipes of the medical writers which contain river crabs are, e.g., Dsc. Eupor. I 145,4, which has καρκίνων ποταμίων κακαυμένων σὺν μέλιτι, a remedy for γαστέρας (scrofulous swellings on the glands of the neck); 193,1, which has the same ingredients and is a remedy for πομπροῦμένα ἔλκη καὶ πυλνείας κακοῦσιν (malignant ulcers and malignant indurations). Cf. also

57) In the recipe on p. 531,9, only one metal, litharge, is called for.

58) 2 metals, 11 times; 3, 11 times; 4, 3 times; 5, 5 times.

59) Several other metals are found fewer times.

60) There is, however, one instance of καρκίνων κακαυμένων (trumpet shells), which are combined with λυδανίου, φειθοίου, κηροῦ, ἐλαίου, τετυνθίνης, λ. βάνου, and ὤδατος (532, 14ff.).

61) I owe this reference to Prof. Ann Ellis Hanson, who scoured the computerized Galen at Princeton for instances of καρκίνων, crab, weeding out the references for καρκίνων, cancer. She discovered that crabs seem to have been much used only in antidotes, especially for poisonous bites and stings. Cf., e.g. Gal. XIII 436,4; XIV 169,2; 170,7; 172,7; 195,16.

Dsc. Eupor. I 171,3; 196; 212; II 122,5; Gal. XIII 436,4; Orib. Syn. VII 46; Paul. III 79,3.

10. [ωκελθίου = ωκευθίου: Also possible is [λαδίου] (cf. note to line B, above) or [λιβάδιου] (cf. footnote 60); λ. βαρυόρου is too long and χαλκοῦ is too short. The spelling ωκελθίου is found in A, 10 and is the normal papyrus spelling (cf. note ad loc.). For this metal see Dsc. V 88; Gal. XII 243. As mentioned above, it is found as an ingredient in 18 of the 30 ἐπουλωτικά of Galen.

11. [μυρτί] you: also possible is [δωδ] you, if spelled [δωδε] you. For μυρτίου ἐλαίου, cf. Dsc. I 39; for papyri. Marganne, p. 365. In his introduction to the ἐπουλωτικά Galen (522,14) has the following: καὶ γὰρ τὰ διὰ τῶν ποτῶν ἐκτιθέμενα φάρμακα τοῦτον ἰσχυρίων ἐν δόσει η̄ μυρτίῳ γίνεται. καὶ μᾶλλον γὰρ τὸ μύρτιον τοῦ δωδίνου χρησιμώτερον. ὅθεν καὶ στυπτικώτερόν ἐστιν. "Applications on pledgets become remedies when the ingredients are melted in rose oil or myrtle oil. Myrtle oil is more useful than rose oil, because it is more astringent." Among Galen's thirty ἐπουλωτικά, where the oil is named, ἐλαίου μυρτίου occurs 11 times, ἐλαίου δωδίνου ἢ μυρτίου, twice, and ἐλαίου δωδίνου, once.

12. τὰ ἑκτά κατὰ τὸν ἑκάστου is a frequent brief direction for the plasters of Galen. Cf., e.g., XIII 338,16; 339,8; 349,11; 675,13; 734,2. See also A, 11ff. and note. For a description of the melting process and the various ingredients that are melted or dissolved, see Gal. XIII 628ff.

13. [μοι]: for the spelling cf. A, 4; A verso, 6; B, 5; F, 6.

μοῖς, υ, and ι were added above the line by the second hand. The position of μοῖς indicates that it was meant to precede a four-letter word, and η̄ ῡ ρ̄ ῑ ᾱ - was probably corrected from η̄ ο̄ ρ̄ ο̄ ᾱ.⁶²⁾ For the interchange of υ and ο, see note to line 6, above; and for the interchange of ι and υ, Mayser-Schmoll, : 1, 80; Gignac, : 267ff. One of Galen's thirty ἐπουλωτικά (525,16) has the following title: ἄλλη ἡ καλεῖσθαι λεγόμενη, ἐκ τῶν Ἀτταλικῶν δυνάσεων φάρμακον ἐκτιθεμένη. "Another, called 'a plaster for burns' (i.e. for ulcers caused by burns), a proved remedy from the Attalian collections of prescriptions."⁶³⁾ Cf. Aët. XV, p. 136,14. For a discussion of ἄλλη καλεῖσθαι cf. Hipp. περί ἐλαῶν 22 (Littre, VI 426); Orib. Syn. VII 6. For emollient plasters with no metals see Paul. VII 17,30 ὁ ἀγχοῦσης ποῖς τὰ καλεῖσθαι, "the plasters with alkanet for ulcers caused by burns." Cf. also the uses of the Azanites recipe in note to lines 3ff. of B in our codex.

62) Or from μοια = μοια, a simple transposition of letters.

63) For "collections of prescriptions" see LSJ, s.v. δύναις II 4. For another Attalian recipe for an ἐπουλωτική, cf. Orib. Syn. III 4. Cf. also Celsus 5.19.11.A, "the plaster of Attalus for wounds"; 6.6.5.B, "the salve of Attalus" for checking rheum.

P.Mich. Inv. 21 C

7.5 x 8.5 cm.

Plate 3a

[...]

 [...]

 [...] τοῦ ἀθελῶν[ε]ων *4]

 4 [κ[α][ι] δταν ἐνωθῇ ἐπ[ὶ]βαλλε]

 [τὸ]ν χυλὸν καὶ τὰ τηκ[τὰ] συν-]

 [εν]ώσας χρῶ[ς]

 ἡ πηγανηρά ἐ[κ] τοῦ

 B [ἀπο]χυοῦ[το] τοῦ πο[τ]έου πο[τ]έου νο-]

 [μῶς πο[τ]έου καὶ ἐλκ[η] καὶ]

 [εἰς] γὰρ καὶ λευκ[ή]

 [...]

Translation

... and when it is mixed, add the juice and the melted ingredients; combine and use.

The rue plaster from the second book of Dionysius is effective for spreading ulcers, wounds, abscesses, and lichen-like skin eruptions ...

3. ἀθελῶν[ε]ων = διηθεόμενος, "filtered". See Stephanus, TGL, s.v. ἀθελῶ, for references. διηθεῖν is the verb most commonly used by the medical writers for "filter, or strain." Cf. Aët. XV, p. 46, 13 εἴτα ἐπιβάλλε τὰ τηκτὰ τὰ χύματα καὶ διηθεόμενα, "then add the soluble ingredients which have been melted and strained." Cf. also pp. 44, 3, 16; 55, 13; 61, 12. The verb διηθεῖν is found in our codex in E verso, 13; H, 14; L verso, 7.

4-5. Cf. Gal. XIII 344, 7 εἴθ' ὅταν καλῶς ἐνωθῇ ... λάμβανε ... μίξας χρῶς; 346, 2 καὶ ὅταν ἐνωθῇ, ἐπιβάλλε κτλ.; 544, 12 τελευταῖον τὰ τηκτὰ ἐξυμμένα καὶ ἐνώσας χρῶς.

4. ἐνωθῇ: for this verb in our codex see E verso, 12; H, 2.

ἐπ[ὶ]βαλλε]: the space would permit ἐπιβάλλας (-βάλλας) as in D, 8-9.

5-6. συνενώσας: for the compound verb in our codex see A verso, 3.

6. χρῶς: the scribe originally wrote χρῶς, which he corrected to χρῶ by slightly enlarging the second loop of ω. In the vacant space after χρῶς is a long forked paragraphos, and between lines 6 and 7 is a blank space.

7. ἡ πηγανηρά: a rue-plaster. Sc. ἐπιπλάσας. For plasters with rue see Paul. VII 17.70 ἡ πηγανηρά ποτὶς πλεονεκτηφόρος; Aët. XV, p. 94 μάλαγμα πηγανηρόν; p. 131 τὸ πηγανηρόν. Alex. Trall. refers several times to the recipe, ἡ πηγανηρά: II 185, 24; 233, 27; 241, 4; but apparently does not anywhere list its ingredients. Among several recipes for plasters called ἐδροικαί, Galen has one entitled ἡ διὰ πηγάνου (XIII 311, 5).

7-8. There is seemingly no "peganera" of Dionysius extant. For references to recipes of Dionysius in the works of Galen see XX 206; for those in Celsus, Loeb ed. III 629; and in Marcellus, CML V 283. None of the recipes calls for rue. In Orib. Fr. 102 (IV 615,7) there is the following: ἄλλο πρὸς κύριγγος καὶ κόκκους ὃ ἐναβου παρὰ Διονυσίου ἐν Ἱερὰπόλει. "Another recipe for abscesses and skin eruptions which those in Hierapolis received from Dionysius," but it has no rue.⁶⁴⁾

8. β was added above the line by the first hand. In Soranus, I 29.3 (CMG IV, p.19), the second book of Dionysius is referred to as entitled περὶ κοινότητων, "Concerning 'The Common Features'," a term especially associated with the "Methodic" school in medicine (LSJ). For Dionysius called a μεθοδικός cf. Gal. X 53; XIV 684.

Among papyri there is at least one example of a recipe of Dionysius, SB VIII 9860 (a), 4-16, Διονυσίου Ἀ ἀρετῇ (sc. σύνθεσις). There is also a good chance that a private letter, sent to a physician called Dionysius, which is dated to 58 A.D. and contains a request for information on specific medical recipes, may have been sent to the medical writer Dionysius (P.Mert. I 12).

8-10. καὶ ὅς τοις νομάς καὶ τοῖς κατὰ τὰς ἀρετῶν ἐκείνων. The restorations are illustrative. For νομάς with ἔλκη, cf. A verso, 6-8, and, e.g., Aët. XV, p.41,5-6; for νομάς with ἔλκη and κύριγγος, among other conditions, Aët. XV, pp. 43,1-2; 50,15-20; 57, 3-7. For ἔλκη with κύριγγος et al., cf. Gal. XIII 402,8; 527,5-6; 794, 14ff.;⁶⁵⁾ and with the addition of λειχήνας, 787,13ff. See also Dsc. III 45.4, where πρήνανον is described as ὡκελεῖ καὶ λειχήνας τὸν μέλιτι καὶ σιμπιλοῖς ἐκτιθέμενον.

10. λειχήνας: also possible is λέχηνας, especially since λειχήνας is spelled λειχήνας in L. 6 of our codex. For λέχηνας with κύριγγος et al., cf. Gal. XIII 423. For λειχῆν and λέχη in papyri see Marganne, p. 364.

Inv. 21 C verso

7.5 x 8.5 cm.

1-1

Plate 3b

[ἡ] λειχῆν ἡ δὲ [ἀπο]δίνου [ἐν-]
[καὶ] ἐπὶ τοῖς στήθεσιν καὶ κοιλίᾳ
4 [προ]σθήσει (δρ.) α λειχῆν (οὐγ.) (τέταρτον)
[ἀπο]στολοχίαν καὶ (οὐγ.) (τέταρτον)
[καὶ] (οὐγ.) (τέταρτον) [ἐν] (οὐγ.) (δρ.) (τέταρτον) ἐλαί-
[ου] (οὐγ.) ε ὡς [ἐν] ὅτι λει-

64) I owe to Prof. J. Arthur Hanson the reference to Gal. XIII 835,6, a λειχηνική of Διονυσίου συμμαθητῆς. The "fellow-disciple" is probably not our Dionysius, and, in any case, the recipe does not include rue.

65) Also Aët. XV, pp.39,18-20; 47,18; 78,23-4, et al.

8 [καὶ τρία σ|κεύαζε καὶ χρ(5)]

[...].)

4,5,6 Pap. d

8. καὶ

Translation

The white plaster with rose oil: 1 drachm of fresh young pig fat, one-fourth ounce of litharge, one-fourth oz. of birthwort longa, one-fourth oz. of wax, one-fourth dr. of myrrh, 5 oz. of oil, the whites of three cooked eggs. Prepare and use.

1. This line contained the end of the preceding recipe.

2. The title of this recipe, "the white plaster with rose oil," is not duplicated exactly in any of the seven parallel texts.⁶⁶ Galen's recipe, reported by Heras as taken from Asclepiades, is called ἡ Ῥωδιακὴ, "the Rhodian plaster." Aët. (1) has the title ἡ ἀπὸ Ἀσκληπιάδου ῥεοῖν καλούμενη καλλίστη, with one MS calling it Ῥωδιακή. Orib. (1) and (2) are both called ἡ διὰ ὠμῶν, "the plaster with eggs"; Aët. (3), "the plaster of Oribasius with eggs"; that of Paulus, "the plaster with white lead, or, with eggs"; while Aët. (2) has the strange name, Φυκοτύχη.⁶⁷ For white plasters in general, see Gal. XIII 409-457.

Our text does not give the purpose of the recipe, but it is found in three of the parallel texts. Galen and Aët. (1) and (2) describe it as a dispersing and healing remedy for hardened swellings of the breast, a good application for anal ulcerations, "and indeed all other ulcerations."⁶⁸

3ff. It is seen from the Table of Ingredients and Amounts that our text is most similar to that of Orib. (2), including the omission of white lead. The amounts of pig fat and oil are the same, while litharge and wax have 2 dr. each in our text, but only 1 dr. each in Orib. (2).

3-4. [καὶ τρία σκεύαζε] (καὶ τρία σκεύαζε): "fresh young pig fat." Aët. (1) has c. ὀρίου π., "fresh pig fat." Gal. has c. ὀρίου κατεργασμένου, "prepared pig fat." i.e., fat from which the fibres and sinews have been removed. Cf. A, 8-9, note. Orib. (2) has c. ὀρίου, and Aët. (2), c. γυνείου, goose fat. Orib. (1), Aët. (3), and Paul. omit the fat altogether.

5. [καὶ τρία σκεύαζε] μακρότερον: For the several different types of birthwort.

66) The seven parallel texts are: Gal. XIII 448,1; Orib. IV 608,3; Orib. (1); 615,24 = Orib. (2); Aët. XV, p.128,1 = Aët. (1); p.128,9 = Aët. (2); p.127,7 = Aët. (3); Paul. VII 17,26. See the Table of Ingredients and Amounts at the end of the commentary.

67) Three of the six MSS of the text have Φυκοτύχη. Cf. footnote 68.

68) The full title of Aët. (2) is ἡ Φυκοτύχη μάλιστα παροῦσα πρὸς τὰ ἐν δακτύλοις ἔλκεα καὶ ἄλλα δὴ πάντα. The Φυκοτύχη of Paul. VII 17,32, although for the same purpose, is quite different from that of Aët. (2), with other metals and many more ingredients.

see Dsc. III 4; Gal. XI 835. δ . $\mu\omega\omega\acute{o}$ and δ . $\sigma\tau\omicron\upsilon\gamma\acute{\rho}\lambda\eta$ (A. Longa and A. Rotunda, respectively) are the two types most commonly found in the works of the medical writers, although birthwort is most frequently found undifferentiated. It is particularly frequent in the $\chi\lambda\mu\alpha\acute{\iota}$ and $\mu\eta\lambda\iota\upsilon\omega\iota$, the yellow-green and yellow-orange plasters.⁶⁹⁾ For its use as an ingredient to "fill ulcers," cf. Dsc. Eupor. I, 175. Our text seems to have a rare example of the ingredient in a $\lambda\iota\omega\kappa\eta$ plaster. For its occurrence in papyri, cf. Marganne, p. 356, and SB VIII 9860 (b) 8.

Among the parallels for this recipe, aristolochia is found only in our text, in the same way that saffron and deer marrow are found only in Aët. (2).

6. $\lambda\omega\lambda\mu\omicron\upsilon$: so also in Orib. (1), (2) and Aët. (2) and (3). It is omitted in Aët. (1),⁷⁰⁾ while Gal. has $\mu\omega\omega\acute{o}$ $\sigma\tau\omicron\upsilon\gamma\acute{\rho}\lambda\eta$,⁷¹⁾ and Paul., $\mu\omega\omega\acute{o}$ $\iota\sigma\alpha\kappa\tau\omicron\varsigma$, white or bleached wax.

$\{ \mu\acute{\upsilon}\lambda\lambda\omicron\upsilon\eta\varsigma \}$ $\mu\acute{\upsilon}\lambda\lambda\omicron\upsilon\eta\varsigma$ is less likely, although it has occasionally been found in papyri. Cf. the relative number of references in Marganne, s.vv. $\lambda\iota\omega\kappa\eta$ and $\mu\acute{\upsilon}\lambda\lambda\omicron\upsilon\eta\varsigma$.⁷²⁾ Cf. also Mayser-Schroll, I 1, p. 177; Cignac, I, p. 121.

6-7. $\lambda\lambda\alpha\acute{\iota}\omicron\upsilon$: the oil is rose oil according to the title in line 2. Orib. (1), Aët. (2) and (3) and Paul. all have $\delta\omicron\delta\acute{\iota}\omega\upsilon$. Orib. (2) has $\delta\omicron\delta\acute{\iota}\omega\upsilon$ η $\mu\omega\sigma\chi\iota\upsilon\omega\upsilon$ η $\lambda\epsilon\lambda\epsilon\upsilon\kappa\alpha\mu\acute{\iota}\omega\upsilon$ $\lambda\lambda\alpha\acute{\iota}\omicron\upsilon$, "rose or myrtle oil or oil that has been clarified." Aët. (1) has $\lambda\lambda\alpha\acute{\iota}\omicron\upsilon$ $\lambda\epsilon\upsilon\kappa\omega\tau\acute{\epsilon}\rho\omega\upsilon$, "the whitest oil," in the list of ingredients, but the brief introduction to the text has $\epsilon\iota\varsigma$ $\delta\epsilon$ $\kappa\alpha\acute{\iota}$ $\epsilon\delta\omega\kappa\eta$ $\delta\iota\alpha\theta\eta$ $\iota\eta\kappa\omicron\mu\acute{\iota}\omega\eta$ $\lambda\lambda\alpha\acute{\iota}\omega$ $\mu\omega\sigma\chi\iota\omega\upsilon$ η $\delta\omicron\delta\acute{\iota}\omega\upsilon$.⁷³⁾ Gal. has only $\lambda\lambda\alpha\acute{\iota}\omicron\upsilon$ in the list of ingredients but he adds, still quoting Heras (cf. note to line 2, above), "Asclepiades did not prescribe with which oil he wished the medicaments to be dissolved, but left it to us to experiment with the use of rose oil, myrtle oil, or some other oil."⁷⁴⁾

7-8. $\delta\{ \acute{\alpha}\} \nu$ $\delta\eta\tau\acute{\epsilon}\nu$ $\lambda\epsilon\upsilon\kappa\acute{\iota}\omega\varsigma$: "the whites of cooked eggs" appear only in our text. Aët. (2) and Paul. have "the whites of eggs," presumably uncooked.⁷⁵⁾ Gal.,

69) Cf. Gal. XIII 466, 481, 492-507, 532-557.

70) The omission of wax in Aët. (1) was in all probability inadvertent, since the recipe was taken directly from Gal. XIII 448, 449ff., as shown by its title, the amounts of the ingredients, and its stated purpose. Galen lumped together the first two ingredients, litharge and wax, $\delta\upsilon\acute{o}$ $\lambda\iota\tau\alpha\upsilon\alpha$ α , and likewise the next two ingredients: $\sigma\iota\mu\omega\delta\iota\omega\upsilon$ $\delta\epsilon$ $\kappa\alpha\acute{\iota}$ $\sigma\iota\mu\iota\omega\upsilon$... $\iota\acute{o}$ $\iota\eta\kappa\omicron$ $\lambda\iota\tau\alpha\alpha$ $\eta\mu\iota\varsigma$ $\tau\omicron\upsilon\tau\acute{\epsilon}\tau\iota\upsilon$ $\sigma\acute{\upsilon}\gamma\gamma\iota\alpha\varsigma$ $\epsilon\acute{\epsilon}$ $\lambda\epsilon\upsilon\kappa\acute{\epsilon}\tau\epsilon\rho\omega\upsilon$. The first ingredient of Aët. (1) is $\lambda\iota\theta\alpha\gamma\gamma\acute{\upsilon}\rho\omega\upsilon$ $\lambda\iota\tau\alpha\upsilon\alpha$ $\mu\acute{\iota}\alpha\upsilon$, followed by $\sigma\iota\mu\omega\delta\iota\omega\upsilon$, $\sigma\iota\mu\iota\omega\upsilon$... $\delta\upsilon\acute{o}$ $\sigma\acute{\upsilon}\gamma\gamma\iota\alpha\varsigma$ ζ .

71) For Pontic as the best wax, being naturally white, see Gal. XIII 411.

72) Of the four references given for $\mu\acute{\upsilon}\lambda\lambda\omicron\upsilon\eta\varsigma$, one has $\{ \mu\acute{\upsilon}\lambda\lambda\omicron\upsilon\eta\varsigma \}$ (p. 138), and another has $\sigma\beta\acute{\upsilon}\rho\omega\{\alpha\}$ (p. 248). Cf. Gazza, Aeg. 36, 1956, 97; Le Monde Grec, 360, note to line 5.

73) One MS omits $\mu\omega\sigma\chi\iota\omega\upsilon$ and another omits $\delta\omicron\delta\acute{\iota}\omega\upsilon$. Cf. the title of Aët. (1) in the note to line 2, above. On the making of myrtle and rose oils, see Dsc. I 29 and 43.

74) Gal XIII 449, 1-4.

75) For such variation, cf. Gal. XII 53: $\delta\acute{\alpha}\nu$ $\epsilon\omega\theta\acute{\epsilon}\nu$ $\lambda\epsilon\kappa\iota\theta\omega\upsilon\varsigma$ δ , $\tau\iota\upsilon\epsilon\acute{\varsigma}$ $\acute{\omega}\mu\acute{\alpha}\nu$.

Orib. (2), and Aët. (1) have "the yolks of cooked eggs." Orib. (1) has ὠμά, uncooked eggs; while Aët. (3) has ὠά only, with the additional statement: τὰ ὠά τελευτάφα ἐν τῇ ἐνώσει συλλεοῦσιν, "the eggs, last of all, are triturated with the other ingredients in the mixing process."

λεῖψ[ὸν τρία σ[κεύαζε καὶ (+ καὶ) χρῶ: If the numeral was not written out, the only alternative would seem to be κατασκευάζε καὶ, but the compound verb is not often found in the recipes.⁷⁶⁾ σκεύαζε καὶ χρῶ, on the other hand, is found frequently, sometimes with slight variations or additions.⁷⁷⁾ If σκεύαζε is the correct reading, the numeral was written out and contained not more than 4 or 5 letters. τέσσαρα, a preferable restoration in view of the similarity of our text to that of Orib. (2), is too long for the lacuna, and μέγρε would seem to be too large a number of eggs.

After the list of ingredients, one of the parallel texts, Aët. (1), has this direction on its preparation: εἰς μέγρε καλῆς συστάσεως, καὶ ψύξεο ἐνί-
χρε τοῖς ὠαῖς λεωθῆσιν καὶ ὀνόου λευκοῦ, καὶ χρῶ ποτὶ μὲν ἀκράτω, ποτὶ δὲ ἀναιμῶ. "Boil until it is of a good consistency, and having cooled the mixture, pour it over the eggs which have been triturated with white wine. Use it either undiluted or diluted."

9. A new recipe was begun in this line, and the line was probably indented.

Table of Ingredients and Amounts

	21 C. verso	Gal.	Orib. (1)	Orib. (2)	Aët. (1)	Aët. (2)	Aët. (3)	Paul.
white lead		6	6		■	6	2	2
pig fat	1 dr.	6		1 dr.	6	6 ⁸²⁾		
litharge	2 dr.	12	6	1 dr.	12	6	2	2
birthwort	2 dr.							
wax	2 dr.	12	6	1 dr.	{ } ⁷⁹⁾	6	1	6
myrrh	1/4 dr.	4			4 gr. ⁸⁰⁾			
oil	5	18 ⁷⁸⁾	enough	5	18 ⁸¹⁾	36	12	18
eggs	{3}	2	4	4	2	30	4	5
starch			8				2	3
saffron						1		
deer-marrow						6		

76) I noted only two examples: Aët. XV. pp. 121,8; 127,6.

77) E.g., Gal. XIII: 359, 524, 525, 536, 556, 739, 744, 747.

78) The amount of oil in Galen's recipe is one and one-half ποτὶλαι. Cf. Gal. XIII 893-4 for 1 kot. of oil = 12 oz.

79) See footnote 70.

80) 4 dr. = one-half oz. Two of the five MSS of Aët. (1) have 4 oz. in place of 4 dr., as in the parallel text of Galen (cf. footnote 70). The Kühn edition of Galen has no app.crit., but 4 oz. of myrrh seems a rather large amount to go with 18 oz. of metals (white lead and litharge), a ratio of

For the recipes in the Table see footnote 66. The amounts are in ounces unless otherwise stated. For easy comparison pounds have been converted to ounces at the ratio of 1 lb. = 12 oz., 1 oz. = 8 dr. (cf. Gal. XIX 752). For our text the amounts of litharge, birthwort, and wax (one-fourth ounce, each) are given as 2 dr. for easier comparison with Orib. (2). Convenient tables of weights are found in Gal. XIX 748ff.; Celsus (Loeb ed.) vol. II, pp. lxxv-lxxvii; Orib. Syn. II 58-59; Paul. VII 26.

1:4 1/2. Our own text has a ratio of 1:8, while 4 dr. of myrrh in Aët. (1) would yield a ratio of 1:36.

81) The oil in Aët. (1), (3), and in Paul. is given in λίτραι. For 1 lit. = 12 oz. see Gal. XIII 616, 11-12.

82) The fat in Aët. (2) is goose fat. Cf. note to lines 3-4, above.

P.Mich. Inv. 21 D

8.8 x 10.2 cm.

)...{

Plate 4a

[ἐπιτε|θεῖτο τοῖς ἐπουλ(ωτι-)]

(κοῖς) καὶ γὰρ πληροῖ ἔλκ(η κοῖ-)

4 [λα] ἰοῦ σκώληξ. ἡ το(ῦ) ὕγ(ει-)

[νοῦ] κίςυος ὁμοῦ (δρ.) δ [ἰοῦ] ξ(υστοῦ)

(δρ.) .| στεατός ὕλου (δρ.) δ κηροῦ (δρ.) δ

[τ|ῆ]ξας τὸ στεαρ καὶ τὸν κη-

8 ρὸν κατὰ τῶν ἄλλων ἐπί-

βαλλας καὶ μίσγων κρῶ >---

ἐφθῇ ἐμμοτος ἢ κοῦμεθα

ἰαῦ ξυστοῦ (δρ.) δ λε(π)ίδος χαλκ(οῦ)

12 [(δρ.) .| σ(υ)στηνείας(α) στρογγύλης (δρ.) β

[ῥυ]θονης (δρ.) ο ἀλ(ῆ)ος (δρ.) . ῥητι-

[νης] (δρ.) σ οἶ δὲ τ [ἐλαίου κατ(ύλην) α]

[δ]εουε| τὸ ἀ(ρ)κωδν

4-5. ὕγιεινοῦ

6. ὕλου

8-9. ἐπιβαλλε

Translation

... should be added to the medicaments which promote cicatrization, for iron rust (*Aerugo vermicularis*) fills hollow ulcers. The plaster of Hygienus: 4 drachms of crude misy (copper ore), ... drachms of scraped iron rust (verdigris), 4 drachms of pig fat, 4 drachms of wax. Melt the fat and the wax, and add to the other ingredients. Mix and use.

A refined tented plaster which we use: 4 drachms of scraped iron rust, ... drachms of copper flakes, 2 drachms of corn alum, 100 (?) drachms of myrrh, 100 drachms of wax (?), ... drachms of bitter aloes, 200 drachms of pine resin - other copies of the recipe have 300, 1 (?) kotyle of oil, a sufficient amount of vinegar, ...

2. [ἐπιτε|θεῖτο, "should be added" gives a suitable meaning; [προ(ε)ι]θεῖτο is too long for the lacuna.

2-3. ἐπουλ(ωτικοῖς): sc. φαρμάκων, drugs which promote the scarring over of wounds. Cf. B verso, 7, with notes to lines 7 and 8-11.

3-4. πληροῖ ἔλκη(τ κοῖλα): On the filling of ulcers, cf. Paul. IV 40 τὸ κοῖλον ἔλκος τῆς ἐλλειποῦσας σαρκὸς ἀπαιτεῖ τὴν ἀναπλήρωσιν, "the hollow ulcer requires the filling up of the deficient flesh." The medicaments used for this purpose are varied. Cf. Dsc. Eupor. I 176 πληροῖ δὲ τὰ ἔλκη βοῦτινον, κηρόν, ἀγρίον, βοδινόν, καὶ. Orib. Syn. III 137 πάνυ γὰρ ἐμψύματα ἔλκη πληροῖ τάχιστα. The ingredients of the recipe are the metals σπῆδον, μόλυβδος, θεῖον ἄπυρον, λεπίς στομάματος, and gum. Aët. XV, p. 70,2 ἔλκη τε πληροῖ κοῖλα καὶ ἐπουλοῖ τάχῃ, βοδινῷ διηθῆν ἢ βοσινίνῳ. The ingredients are the metal λιθάργυρος, oil, wax, et al. P. 103,22 τηκομένη δὲ σὺν βοδινῷ ἑλαίῳ πολλῷ, τὰ κοῖλα τῶν κακοῦσιν ἔλκων μονογενῶς ἀναπληροῖ, "being melted with a great deal of rose oil, it fills the hollows of malignant ulcers in a unique way." The metals in the recipe are λεπίς χαλκοῦ and ῥόζ.

4-5. [ὁὐ σκόληξ, μίσις ὤρεος: iron rust in the form of worms, crude misy, copper.⁸³⁾ For these metals as cleansing and less caustic than χαλκός, λεπίς χαλκοῦ, and χαλκίτις (other forms of copper), see Gal. XII 721,4 τοῦτου δὲ τοῦ γένους ἐστὶ καὶ τὸ μίσις καὶ ὁ ῥόζ, ἐμψύματα φάρμακα τοῖς πρὸς συκώσεσιν καὶ τύλους ἀνοῖσιν ἐμψύματα. "Of this kind are copper and iron rust; they are the strongest medicinal ingredients suitable for ulcers which are of the type similar to ripe figs and for callouses." Cf. Paul. IV 43 and 44 on the powers of μίσις and ῥόζ, together with other metals, in the treatment of fungous ulcers, spreading ulcers, abscesses, and putrid sores.

4. ἡ το(ὐ) ὕγι(εινοῦ) = ὕγιεινός: sc. ἐμψύματος.⁸⁴⁾ Our recipe ~~is~~ Hygienus, a previously unknown recipe, contains four ingredients: crude copper, iron rust, pig fat, and wax. The known recipes of Hygienus include a collyrium for treatment of diseased eyelids and several plasters for various ailments.⁸⁵⁾ One of the latter, that for hard-to-cicatrise ulcers, συκωῦ-λιστα, (Gal. XIII 512), is similar to our recipe. It calls for ῥόζ εὐετός and κηρόν, but substitutes χουσεκόλλα ~~is~~ copper carbonate) and λιθάργυρος for μίσις, and adds two further ingredients.

8. [ὁὐ εὐετός]: ε[κώλητος] is too long for the lacuna. Cf. note to line 11, below.

6f. This recipe has only two soluble ingredients, pig fat and wax. Cf. A, 8-11, which has the same two solubles plus two metals, white lead and litharge, and ~~is~~ also a plaster for healing ulcers.

9. μίσκων: for the form see LSJ, s.v. μίσκωνι. The imperative μίσκω is

83) For [ὁὐ σκόληξ] see Dsc. V 79,6; Aët. II 56. For misy as the top layer of three layers of copper ore (μίσις, χαλκίτις, σῆσις), especially found in Cyprus, see Dsc. V 100; Gal. XII 226; Aët. II 64.

84) For dropped letters in this codex see Introduction, ad fin.; line 12, below, and B, 2, 12-13. For the name ὕγιεινός see Pape, Gr. Eigenn. It is a variant of the more common ὕγιενος, ὕγιενος: cf. the fem. forms ὕγιεια, ὕγια, ὕγια.

85) Gal. XII 788; 488; XIII 353; 512 = 747.

frequently found in the medical writers, e.g. Gal. XIII 270,3; 551,11; 731, 11; 779,14; 864,5; Alex. Trall. II 575; Paul. VII 17,18; and in papyri, P. Aberd. 10,8. But cf. e.g. Gal. XIII 752,12 $\kappa\alpha\theta\omega\ \mu\acute{\iota}\sigma\gamma\omega\nu$ [scv $\acute{\iota}\phi$ $\acute{\alpha}\nu\theta\upsilon\lambda\omicron\upsilon\nu$], "by joining together equal amounts of wax and iron it becomes a cicatrizing plaster."

101 This line, which introduces a new recipe, was not indented, but a blank space was left between it and the preceding line.

$\epsilon\omega\theta\eta$ $\epsilon\mu\mu\omicron\tau\omicron\varsigma$: sc. $\epsilon\mu\lambda\alpha\kappa\tau\omicron\omicron\varsigma$, for an ointment and a plaster described as $\epsilon\omega\theta\eta$, see Gal. XII 834, 835. On $\epsilon\mu\mu\omicron\tau\omicron\varsigma$ see notes to A verso, 5 $\epsilon\mu\mu\omicron\tau\omicron\varsigma$ $\omega\alpha\omega$ - $\mu\alpha\kappa\alpha$ and 7 $\epsilon\mu\mu\omicron\tau\omicron\varsigma$ $\delta\gamma\alpha\delta\upsilon$.

δ $\kappa\acute{\rho}\omega\mu\epsilon\delta\alpha$: Galen usually employs the singular δ $\kappa\acute{\rho}\omega\mu\alpha$, e.g. XIII 489, 490, 495; but occasionally he uses the plural, as in XIII 1027,1. Cf. also for the plural Ortb. III 569,14; Aët. VIII 16 (p. 427,16); XV, p. 94,19.

11-15. The ingredients of this recipe are found, with slight variations and additions, among Galen's $\epsilon\mu\lambda\alpha\kappa\tau\omicron\omicron\varsigma$ $\chi\lambda\omega\acute{\alpha}$ $\lambda\epsilon\iota\chi\eta\nu\iota\omega$, "yellow-green plasters for leichen-like skin eruptions."⁸⁶ See especially XII 843,11 $\tau\omicron\upsilon\sigma\alpha\nu\omicron\varsigma$ $\delta\rho\chi\alpha\iota\omicron\upsilon$ δ $\epsilon\delta\chi\rho\omicron\upsilon\varsigma$ $\mu\epsilon\gamma\alpha\lambda\iota\nu\eta$; and 843,15 $\text{Ἀντιόχου, ταύτην Τιμοκράτης μετά τὴν ἐκδορὰν τῶν λειχῶν ἐπιτίθειν, hereafter referred to as Gal. (1) and (2), respectively. And among the $\chi\lambda\omega\acute{\alpha}$ taken from the works of Andromachus, XIII 493,7, that of $\eta\alpha\iota\omicron\upsilon\varsigma$ = Gal. (3); and 493,16, that of $\text{Ἀλκυμίων = Gal. (4); and from the works of Heras, XIII 775,6, that of Epigones, sometimes called "the Isis" = Gal. (5). Cf. the Table of Ingredients and Amounts at the end of the commentary.}$$

11. $\acute{\iota}\omicron\delta$ $\xi\upsilon\alpha\tau\omicron\delta$: scraped iron rust (verdigris) was a granular form of rust as opposed to $\acute{\iota}\omicron\delta$ $\epsilon\mu\lambda\alpha\kappa\tau\omicron\omicron\varsigma$, rust shaved off in the form of worms. $\acute{\iota}\omicron\delta$ $\xi\upsilon\alpha\tau\omicron\delta$ is more commonly found in the recipes for plasters. But see line 4, above, and note to lines 4-5.

13. $\zeta\mu\acute{\upsilon}\omicron\upsilon\nu\omicron$ (60.) ρ : On the spelling see note to C verso, 6. The reading is not in doubt, and it is noteworthy that this ingredient immediately precedes $\acute{\alpha}\lambda\acute{\iota}\omicron\eta$, as in Gal. (5). In Gal. (4) the two ingredients are successive but in reverse order. However, the amount of myrrh, 100 drachms, is so enormously disproportionate to the amounts in Gal. (4) and (5) that we are forced to suspect that our rather careless scribe has conflated two ingredients, $\zeta\mu\acute{\upsilon}\omicron\upsilon\nu\omicron$ and $\kappa\alpha\theta\omicron\delta$, giving myrrh the large amount which wax should have, and

⁸⁶ XII 842.

⁸⁷ Omitted from the Table are Gal. XIII 492,7 and Paul. VII 17,39, both duplicates of the Isis recipe of Epigones. They differ from Gal. (5) only in the amounts for resin (200 dr. in both), oil (one-third kot. in Gal. and one-half or one-fourth kot. in Paul.), and vinegar (both have "a sufficiency"), plus the addition of another ingredient. Omitted also is an $\epsilon\mu\lambda\alpha\kappa\tau\omicron\omicron\varsigma$ $\lambda\epsilon\iota\chi\eta\nu\iota\omega$ of Aëtius (VIII 16, p. 425,24), which calls for large amounts of wax and resin (100 dr., and 200 dr., respectively), and many additional metals. In Gal. XIII 494 the Athena recipe calls for 250 dr. of wax and 300 dr. of resin, plus the ingredients of our text and several more in addition.

omitting wax altogether. All five of the Galen recipes have large amounts of wax; see the Table at the end of the commentary. In a rapid survey of many recipes in Galen which contain myrrh, I found no instance of an unusually high amount.

13-14. ἀλ[όν] (δρ.) . δητίν] (δρ.) σ οἱ δὲ γ: Among the parallel texts, ἀλόν is found in Gal. (1) and (5), while rock salt, ἀλόν ἀμμωνιακόν, is found in Gal. (1), (3), (4), and (5). ἀλ[όν] is possible in line 13 only if ἀμμωνιακόν were omitted. If included, ἀλ[όν] ἀμμωνιακόν would be the ingredient with the very large amount of 200 or 100 drachms. See preceding note. In four of the Galen recipes - (2), (3), (4) and (5), resin has the highest amount, while in (1) it shares the highest amount with wax.

δητίν]: Gal. (1) has φρουκτῆς, (2) κολομνίας, (3) δητίνης κολομνίας, (4) and (5) τριμυθίνης.

14. (δρ.) σ οἱ δὲ γ: The remnant of τὰυ is a horizontal stroke which is too long to suit the top of rho. Cf. Gal. (5): (δρ.) σ οἱ δὲ ρ. On the use of οἱ δὲ to indicate alternative amounts of an ingredient, cf. ZPE 23, 1976, 124-5. Examples of expanded statements are the following: Gal. XIII 721, 15 (οὐ εὐκτοθ (δρ.) θ, ἐν ἐνίοις δὲ τῶν ἀντιγράφων γέγραπται (δρ.) α; Aët. VIII 16 (p. 424, 21) ἐν ἄλλαις γραφαῖς οὕτως κτλ.

14-15. ελαιον and ὄξος are the last ingredients in all of the parallel texts. In three of the five texts, the oil is given in κοτύλαι: 1 kotyle in (2) and (5) and one-half kotyle in (4). Gal. (1) has 10 ounces which is equivalent to five-sixths of a 12-ounce kotyle.⁸⁸⁾ But see Gal. XIII 894 for the μικρά κοτύλη of 10 ounces, which was the probable intention in Gal. (1). Gal. (3) has one-half kyathos = one-twelfth kotyle.⁸⁹⁾

15. [ὄξους] τὸ ἀ[ρκεῖν]: Gal. (1) and (2) have the same; (3) has τὸ ἰκανόν; (4) has κοτύλην ἡμικυ; and (5) κοτύλας θ.

88) For 12 ounces = 1 kotyle, see C verso, footnote 78.

89) For the equivalence of 1 κύαθος = one-twelfth of a εἰςκτης = one-sixth of a κοτύλη, see Gal. XIX 765. The text of Gal. (3) has ἐλαίου κύαθου τὸ ἡμικυ in the edition of Kühn which has no app.crit. But in view of the very small amount of oil denoted by a half kyathos, one wonders if κύαθου τὸ ἡμικυ were perhaps an error for κοτύλην ἡμικυ, as in Gal. (4). Or, if symbols were used, κύαθου 4 (= one-half kyathos) could easily be confused with κύαθου 6 (= 6 kyathoi = 1 kotyle), as in Gal. (1), (2), and (5).

Table of Ingredients and Amounts

	21 D 10-15	Gal. (1)	Gal. (2)	Gal. (3)	Gal. (4)	Gal. (5)
iron rust	4	16	12	8	16	8
copper flakes	[]		12	12	16	8
corn alum	2	16	12	8	16	6
myrrh	100 ⁹⁰⁾				16	12
aloes	[]				12	12
wax	100 ⁹⁰⁾	200 ⁹¹⁾	100	150	150	100
resin	200/100	200 ⁹¹⁾	200	300	200	200/100
oil	[1 kot.]	1 kot. ⁹²⁾	1 kot.	1/12 kot. ⁹³⁾	1/2 kot.	1 kot.
vinegar	enough	enough	enough	enough	1/2 kot.	2 kot.
rock salt		16		8	12	8
manna		16	12			
copper		32		8	16	8
all-heal			12		16/12/8	12
frankincense				16	10	8

The amounts in the Table are in drachms. The ounces and pounds of Gal. (1) have been converted to drachms for convenience of comparison at the ratio of 1 lb. = 12 oz. and 1 oz. = 8 dr. Cf. Gal. XIII 492,13; 616; XIX 752. Gal. (4) and (5) have two additional ingredients, not given in the Table, birthwort ($\delta\alpha\iota\tau\alpha\lambda\acute{o}\chi\epsilon\iota\alpha$) and incense-gum ($\acute{\alpha}\mu\mu\omega\nu\iota\alpha\kappa\acute{o}\nu \theta\upsilon\iota\alpha\upsilon\alpha$).

Inv. 21 D verso

8.8 x 10.2 cm.

.....
 [...].[....]......[
 [...].[....].[....] πρὸς [τὰς]
 ἄσθας ἑλκή μετὰ πρὸς [τὰς]
 4 [χ]υλίου πρὸς νομὴν μετ[ὰ]
 [...].[....].[....].[....].
 [μ]ετὰ ἁρώτου [τ]οῦ ἑλίου καὶ
 ὀξὺς πρὸς καὶ τὰς σκεῶν-
 8 ναὶ μετὰ χολορείου στέατος

Plate 4b

90) Cf. note to line 13.

91) For wax and resin Gal. (1) has λίτρος β (= 24 oz. = 192 dr.). This approximates the round number 200: cf. the amount of resin in our text and in Gal. (2), (3), (4), and (5), where the quantities are given in units of 100 dr.

92) This is a "small" kotyle. Cf. note to lines 14-15, above.

93) See Footnote 89).

καὶ χυλοῦ εἰτέας πρὸςθε-
 τα ἐν τοῖς[ε] μέλιτι καὶ βα-
 γάδας καὶ δακτύλοις ἀκρό-
 12 τῃ τῆς ξυ[λ]ίνης παραπλε-
 {κ}ίμενα τ[ὶ]ς[ὶ]ν παραμάκω[ν]
 [...]. [...]. καὶ β[ε]ν[ε]ρ[ε]ν[ε]
 [...].
 [...].

7. καί, σπινθόδονας 9. εἰτέας 10. μέλιτι 11. καί

Translation

... for aphthae and ulcers, triturate with the juice of endive; for spreading ulcers, with ...; for ..., triturate with undiluted oil and vinegar; and for septic ulcers, with young pig fat and juice of willow. Applications for cracks of the skin on the palms of the feet and the toes are the mixtures of medicines with the undiluted juice of willow. ...

2-3. πρὸς {τὰς} δόδας ἔλκη: ὅτι δόδαί, small ulcers of the mouth, see Gal. XII 988 περὶ τῶν πρὸς δόδας παραμάκων, 990,7 τὰ ὅτι "ἀνδρομάχου γυναικίμενα πρὸς δόδας. For δόδαί joined with ἔλκη cf. 990,12 πρὸς δόδας καὶ ἔλκη. Cf. also XII 54, s.v. κύκρος: καὶ μὲν καὶ τοῖς ἐν τῇ στόματι γιγνομένοις ἔλκεσιν αὐτομάτως καὶ μάλιστα τοῖς ἀφωδύουσιν αὐτοῖς τε τῶν παιδῶν τοῖς δόδασι δουρῶσι διαμασώμενα. "Cyprus (henna) is suitable for spontaneous ulcers present in the mouth, and especially for those suffering from aphthae; it also joins together chewed-up flesh in the same aphthae of children." Gal. XII 59, s.v. λευκὸν: οὕτω δὲ καὶ μετὰ κηρωτῆς ἔλκη συσπρούλματα θραύονται ὅ' αὐτῇ τινος οὖν μέλιτι καὶ πρὸς δόδας. "With a cerate, gilliflower heals hard-to-cicatrise ulcers; and some use it with honey for aphthae."

2-9. πρὸς ... μετὰ ... (water): for the structure cf. PSI X 1180,56ff.: λέάναι χρ(ῶ). πρὸς ἐουσίηλιατα⁹⁴ μεθ' ὕδατος, πρὸς ἐλκυστικὰ μετ' ὀίνου Αἰγυπτίου, τραυματικὴ ἀναπληροῦ μετὰ μέλιτος, ὠταλγίας μεθ' ὀδορομέλιτος, πρὸς δαυδά(ας) μετὰ βουτύρου ἢ κασίου χυλοῦ, κτλ. "Triturate (the ingredients) and use. For erysipelas, triturate with water; for spreading ulcers, with Egyptian wine. As a remedy for wounds, with honey, it fills in the hollows; for earache, triturate with hydromel; for cracks of the skin, with butter or juice of nut."

3. εἰτέας: endive. Also possible is εἰπιδόας, but the medical writers seem generally to prefer εἰπέας. Cf. Gal. XII 119; Sdr. I 51,2 (acc. εἰπιν); Alex.Trall. I 341,4; 439,17; II 271,23; 409,18; Aët. I 355; but Dsc. Eupor. I 212 εἰπίδας. Also found is εἰπίας (Gal. XI 54,15). The only reference in papyri to εἰπίς is found in P.Mich. II 123 Verso IX 23, a graphelion account

94) ἐουσίηλιος is usually found in the plural. Cf. Gal. XIII 835-837; Dsc.Eup. I 160, 161; Orib. III 655; IV 616; Aët. XV, p.11; and in our codex, A verso, 9. and notes ad loc.

of the first cent. A.D., τιμῆ(ς) κραιβῆς καὶ κέρων.⁹⁵⁾

On the two kinds of endive, ὄνια, wild, and ἡερὸς, domestic or cultivated, and their use, see Dsc. II 132; Gal. XII 119. In Dsc. Eupor. I 212, the juice of endive with manna heals cracks in the skin: τὰς δὲ ραγάδας θραπέουσι ... κέρως χυλὸς σὺν μάννῃ.⁹⁶⁾ Cf. note to lines 10-11, below.

4. νομῆν: on this type of ulcer see A verso, 7, note.

5. A horizontal break through this line has carried away most of the writing, so that remnants of ink are too meager for satisfactory identification of letters. The line contained the ingredient used for spreading ulcers (line 4) and the name of another ailment (πρὸς ...) for which undiluted oil and vinegar were used (line 6).

7-8. κραιβῆς, putrid, septic ulcers, are frequently found with νομῆ, spreading ulcers, ῥυπαρὰ ἔλκη, foul ulcers, et al. Cf. Gal. XII 683; XIII 473, 731, 778, 909; Dsc. Eup. I 190, Orib. IV 515, 620, 23; Aët. XV, pp. 41, 110, 135.

9. κίτρεα + ἵτρεα. The correct spelling is found in E verso, 7. On the willow tree and its uses see Dsc. I 104; Gal. XI 891. The fruit, leaves, bark, and juice are said to have an astringent quality. A yellow plaster of Galen (XIII 800), called ἡ δὲ ἵτρεα is highly esteemed and has many applications, e.g. for bleeding ulcers, abscesses, and erysipelas. It calls for the leaves of willow. A variant recipe called μέλαινα ἡ δὲ ἵτρεα (XIII 740-741) calls for tender leaves (ἀπαλὸν τὸν φύλλον) and is recommended for discharges, hard-to-cure ulcers, cancerous affections, and all indurations. A recipe in Aëtius (XV, p. 61), entitled ἐκ τῶν ὀρεθασίων ἡ δὲ τοῦ χυλοῦ τῆς ἵτρεα, gives the method of extracting the juice from the leaves. A cosmetic recipe for darkening hair calls for the juice of the bark of willow (Gal. XII 444).⁹⁷⁾

10-11. ἐν τοῖ(ς) μέλαισι ραγάδας καὶ ἰ = καὶ) δακτύλοις: For a definition of ραγάς see Gal. XIX 446 ραγάς ἐστὶ διαφθορὰ τετυλωμένα ἔχουσα τὰ χεῖλη, "a rhagas is a break of the skin which has calloused edges." Cf. Dsc. Eupor. I 196 ραγάδας δὲ τὰς ἐν ποτὶ θραπέουσι ἐντιθέμενα, "applications which heal cracks of the skin on the feet." Orib. Fr. 97 (IV 611, 21) ἡ ἀνίκητος πάγκρηστος, "an unfailing all-purpose medication" ... πρὸς τὰς ἐν πέλασι ραγάδας, Fr. 113 (IV 621) πρὸς ραγάδας πελμάτων καὶ ποδῶν (heels). Syn. VII 46 (V 391) πρὸς τὰς τῶν δακτύλων ραγάδας καὶ τῶν ὀλων ποδῶν. Aët. XV, p. 74, 7 [ἔται τὰς ἐν πέλασι ραγάδας ἀνεθὲν βοδίνῃ. Cf. Paul. III 79, and note to lines 2-9, above.

95) P. Mich. II 128 (a) is a duplicate of 123 Verso IX 8-30.

96) For other examples of the use of endive-juice in various remedies, cf. Dsc. II 132, ad fin.; Alex. Trall. I 341, 439; II 409.

97) I owe many thanks to Prof. John Arthur Hanson who sent me all of the instances of ἵτρεα in Galen from the computer, and many other words I requested while working on Mich. Inv. 21.

11-12. ἀποδάτω: sc. χαλῶ.

12. τῆς ξυ(λ)ίνης = ἱτῆας: cf. line 9.

14. κράμβη(c): On the kinds and uses of cabbage see Dsc. II 120-122. Gal. XII 42-44. Together with meal of fenugreek and vinegar, it is good as ■ plaster for long-standing and foul ulcers; and the leaves of it, ground small and applied either alone or with barley-groats will help all inflammations, erysipelas, leprosy, and carbuncles.

P.Mich.Inv. 21 E

9.3 x 13.5 cm.

Plate 5a

1. 1
 τὰ τηκτὰ καὶ (τὰ ἑρᾶ λευ-)
 ὥστε ἀνάλαβε ποιῶ δὲ καὶ
 4 2 πρὸς πάντα θη[ριῶδη ἔλκη]
 Ἡρᾶ φ[α]ιδά ἢ εὐπ[λαστρὸς]
 λιθαργύρ[ο]υ (λίτρ[ας] β [όητιν]ος (λίτ.) .)
 λεπ[ι]δὸς χρ[ο]λκοῦ (λίτ.) . μᾶννη (λίτ.) .
 8 κηροῦ (λίτ.) β [ε]λαίου (λίτ.) .
 3 7 μολίνη τελαμώνιος
 καλούμενη λιθ[αργύρου] ψιμ[ι]-
 θίου πιτυίνης ἀ[σβέστου] ἀνᾶ
 12 (λίτ.) 5 ελαίου (λίτ.) 5 κηροῦ (λίτ.) .
 [εἰ]ροῦ εὐεταῖο [οἶ]ου . ποιῶ δὲ καὶ
 [π]ρὸς τὸ ἐνα[ι]μον τραῦμα
 [καὶ] πλ[η]νῶς (τῶν θηρίων)

3. ποιῶ 10-11. ψιμυθίου. Cf. A, 10.

Translation

Pound the dry ingredients and add the melted ingredients to make a medication. It is good for all malignant ulcers.

The grey plaster of Heras: 2 lbs. of litharge, ... lbs. of pine resin, ... lbs. of copper flakes, ... lbs. of frankincense, 2 lbs. of wax, ... lbs. of oil.

The yellow plaster called "Telamonios": 8 lbs. each of litharge, white lead, pine resin, and unslaked lime, 6 lbs. of oil, 6 (?) lbs. of wax, ... oz. of scraped iron rust. The plaster is effective for bloody wounds and for injuries caused by wild beasts.

Approximately 10 letters are lost from every line on the right side of the text, and the supplements are frequently illustrative.

1-4. These lines contain the end of a recipe for a plaster to be applied to malignant ulcers.

3. ποιῶ (= ποιῆ) δὲ καὶ: Cf. M, 4; B, 5; et al. Also possible = χρῶ δέ, καὶ χρῶ, aut sim. Cf. Aët. XV, p. 54, 16 ... καὶ ἐπὶχε τοῦ λειωθεῖσι, καὶ

ἐνώσας ἀναλῶσθαι καὶ χρῶ. αὕτη ποιεῖ πρὸς τὰς προσφάτους διατρίψεις, πρὸς νόσηματα, κτλ. "Pour (the melted ingredients) over the pounded dry ingredients, unite, mix, and use. This is effective for recent breaks, lesions, etc." And cf. p.130,10 ἐν τῇ θυίᾳ ξηρὰ ἐπιβάλλε τοῦτοις τὰ τεκτὰ καὶ ἐνώσας ἀναλῶσθαι. χρῶ δὲ ἐπὶ μὲν τῶν ἀνθράκων ... "Cast the (pounded) dry ingredients into a vessel, unite the melted ingredients with them, mix, and use for carbuncles, etc." Cf. also *Scrib. Syn.* VII 11 (V, 339), a section titled *περὶ κακοῦλων ἑλκῶν*, "concerning malignant ulcers," which has the following (342,5): τὸν κηρὸν θερμάνας καὶ μαλάξας ἀνάλαβε τὰ ξηρὰ λεῖα, καὶ εἰς ὀδόντιον ἐμπλάσας ἐπιτίθει. πρὸς δὲ τὰ θηριώδη (sc. ἑλκῆ) εἰδόντων λίτον καύσας ἐπιτίθει. "Heat and soften the wax and add the pounded dry ingredients; make it into a poultice on a piece of linen and apply. For malignant ulcers, burn pounded pomegranate-peel and apply."

4. πρὸς πάντα θη[ριώδη ἑλκῆ]: The dotted letter is represented by a vertical stroke on the edge of the papyrus. ἑλκῆ may have been omitted, leaving a short line as the final line of the recipe. For θηριώδη ἑλκῆ see *LSJ*, s.v. θηριώδης, III, and *Desc.* II 108.2, where bitter vetch (δοσθός) is said to cleanse ulcers and cause malignant ulcers ((θηριώδη), carbuncles (ἀνθράκες), and a disease of the skin (κηρία) to be broken up. Cf. *Aët.* II 96 (p.186,33) where ὁδοὺ γάλακτος (whey, the watery part of milk) is good πρὸς τὰ καλαιὰ δὲ ἑλκῆ καὶ τὰ θηριώδη.⁹⁸⁾

For πρὸς πάντα θη[ριῶν θήγματα], "for all bites of wild beasts," as an alternative reconstruction of line 4, cf. *Gal.* XIII 906.3, where a plaster *■ Crito* has εὐθετεῖ δὲ καὶ πρὸς πᾶν θήγμα τῶν θηρίων.⁹⁹⁾

4, marg. A curving line (∩) before πρὸς joins the paragraphos below πρὸς to mark the end of one recipe and the beginning of another. No space was left by the scribe between lines 4 and 5, but line 5 was indented to further mark the beginning *■* a new recipe.

5. 'Ηρᾶ: The name was added *■* by the second hand in the space left by the indentation of the line, with initial eta extruded into the margin.¹⁰⁰⁾

φ[α]ιᾶ: Also possible *■* ([ε]ρᾶ. Cf. below. The name of the plaster contained no more than four letters, the last *■* which *■* alpha. The small remnant of the first letter *■* the bottom of a descender, suitable for φ, ι, or ρ. Rather more of the third letter remains, but it also is a descender, suitable for the same three letters. Our recipe has six ingredients, of which four are preserved: litharge, copper flakes, wax and oil.

98) I owe the references to Aëtius and *■*ulus to Ann Ellis Hanson of Princeton who sent me all the references to θηριώδης in the works of the medical writers which have so far been put on computer.

99) Cf. also *Gal.* XIII 778.17 for θηρίων πλῆγας and note to lines 14-15, below.

100) For other recipes of Heras in our codex see Introduction, with footnote 10; A, note to line 6; B, note to lines 2-4.

6. λιθαργύρ[ο]υ: litharge, lead monoxide, is included in all eighteen phalae, and is the first ingredient in fifteen instances. The amount of litharge, 2 dr., is the same as the amount of wax in line 8 - the only two amounts which are preserved in our text. In the fourteen phalae which also have wax the amounts of litharge and wax are the same in six of the recipes (Nos. 1, 2, 6, 9, 10, 17). In No. 4 the amount of wax is double that of litharge, but in all other cases the amount of litharge is double, quadruple, or more, that of wax.

[δητίνης (λίτ.) .]: resin is present in 15 of the 18 phalae: δητίνης 6 times, and τερμινθίνης 9 times.¹⁰⁶ The latter is too long for the lacuna in line 6, as also κολοωνίαν (sc. δητίνης).¹⁰⁷

7. ἀπ[ι]δός χ[α]λκός: copper flakes are found in 12 of the 18 phalae. In 5 of the remaining 6, καλκός κακαυμένον, burnt copper, is used instead.

μάννης (λίτ.) .]: also possible is λιβάνου. μάννης, or λιβάνου, or μάννης λιβάνου, frankincense, is found in 12 of the 18 phalae.¹⁰⁸

8. κηρός is found in 14 of the phalae. On the ratio of the amount of wax to that of litharge see note to line 6.

ἐλαίου (λίτ.) .]: oil is present in all of the 18 phalae. There are 13 instances of ἐλαίου, olive-oil, and 7 instances of κίκεως,¹⁰⁹ κικίνου,¹¹⁰ or ἐλαίου κικίνου¹¹¹ castor-oil. Nos. 12 and 18 call for both olive-oil and castor-oil.¹¹² It is possible that line 8 in our text had ἐλαίου κικίνου (λίτ.) .], since the lacuna at the end of line 7 accommodated 11 letters

106) No. 6 has δητίνης κολοωνίαν, and No. 5 has δητίνης (δρ.) 6, κολοωνίαν (δρ.) 7. [The 4 dr. after δητ. was surely inadvertently inserted between δητ. and κολοω., when the scribal eye strayed to one of the instances of "4 dr." in the preceding line.] No. 7 has δητ. ἐπός, while No. 9 has τερμινθίνης (δρ.) 18, δητ. ἐπός (δρ.) 12, which may well be a copying error in the same way as No. 5. No. 15 has πιτούνης (sc. δητ.).

107) Cf. P. Grenf. I 52, 7, for an instance in the papyrus of κολοωνίαν standing alone.

108) μάννης, 3 times; λιβάνου, 7 times. The two instances of μάννης λιβάνου in No. 12 (913,8) and No. 18 (922,12) both have copying errors, as shown by the text in both cases. No. 12 has λιθαργύρου (δρ.) 80 (= 144 δρ.) . . . τερμινθίνης (δρ.) 80 (= 72 δρ.), ἀμυγδαλοῦ θυμιάματος (δρ.) 80, μάννης, λιβάνου ἀνά (δρ.) 80 (of each 102 dr.). After the ingredients Galen has the following: "It is evident that he (Andromachus) intended the amount of litharge . . . to be double that of τῆς τερμινθίνης καὶ τοῦ θυμιάματος καὶ τοῦ λιβάνου." The text should therefore have been μάννης λιβάνου (δρ.) 80. For μάννα λιβάνου cf. LSJ s.v. μάννα.

No. 18 has, in the metre of the poet-medical writer Damocrates, τερμινθίνης τε τῆς καλῆς τοῖς 18, μάννης, λιβάνου τε ταῦτό τῇ τερμινθίνῃ. In the following directions for mixing, each ingredient is mentioned separately, but μάννης, λιβάνου τε is represented by τότε βαλεῖτε τὴν μάνναν. The text needs only to have the comma removed after μάννης.

109) Nos. 1, 2, 5, 10, 12. Cf. Gal. XIII 893,3 τοῦ κίκεως, ὅπερ ἐστὶν ἐλαίου κικίνου.

110) No. 18 (922,8).

111) No. 17 (920,11).

112) Nos. 12 and 18 (913,11-12; 922,8).

with no lotas.

(λίτ.) .; has been restored in line 8 because of its use in line 12, where also the amounts of the other ingredients are given in λίτραι, but κοτύλαι), as in ■ verso, 11, is of course possible. Among the 18 phasiae the amount of oil is given in κοτύλαι 13 times, in 11 of which all of the other ingredients are in δραχμαί.¹¹³⁾ In No. 15 the oil is an λίτραι, as also 3 other ingredients, while the remaining 4 are in ούγγιαι. In No. 18 the oil and 4 ingredients are in λίτραι and the remaining 3 in δραχμαί.¹¹⁴⁾

9-15. A new recipe began in line 9, with a space left between lines ■ and 9, and with line 9 indented by 2.5 cm. Before the first word in line ■ are two elaborated paragraphoi, which were made by the scribe to further mark the beginning of the new recipe.

The new recipe is a μηλίνη, a yellow plaster.¹¹⁵⁾ For many recipes called μηλίναι ἐμπλάστρια see Gal. XIII 503-517. Of these recipes Galen says (503) ὡς περ τῶν χλωρῶν ἐμπλάστρων αἱ πλεῖστα διὰ τὸν (ὅν) ἐπικρατοῦντα γίνονται τοιαῦτα, καὶ μάλιστα αὐτῶν αἱ εὐχρῶστερα, κατὰ τὸν αὐτὸν τρόπον καὶ αἱ μηλίναι, ἀλλ' αἱ μὲν χλωραὶ τὸν (ὅν) ἀνέφθοντον ἔχουσιν, αἱ μηλίναι δὲ ἐψόμενον μὲν, ἀλλὰ μετρίως. ὥς ἐάν γε ἐπὶ πλέον ἔψῃ, τὰς καλουμένας ὑπ' ἐνίων μὲν διχρῶμους ὑπ' ἐνίων δὲ κισσῶς ἐργάσθ. "Just as most of the greenish-yellow plasters become such by reason of the color-property of iron, especially those that are better colored, the yellow plasters become such in the same way. But the greenish-yellow plasters use unboiled iron, while the yellow use iron that is boiled, but only moderately. If you boil it more, it will make plasters that are called by some 'two-color' and by others 'orange-tawny'."

But iron is not an indispensable ingredient of a μηλίνη ἐμπλάστρος. Of the twenty-two μηλίναι which Galen cites in succession¹¹⁶⁾ only ten require iron, as in our line 13.¹¹⁷⁾ With respect to the four remaining ingredients preserved in our text (lines 10-12) - litharge, white lead, resin, and oil - litharge is present in all but two of the ■ μηλίναι recipes of Galen, and, with one exception, always comes first as in our text. White lead (Πιτυόθειον) is found in only four of the recipes, but in 3 of them it follows directly

113) Nos. 1-8, 11, 12, 17. In No. 9 oil and vinegar are in κοτύλαι, litharge in λίτραι, wax in μυαί, and the remaining 7 ingredients in δραχμαί. In No. 10 castor-oil and sea-water are in κοτύλαι and the remaining 7 ingredients in either δραχμαί or μυαί.

114) In Nos. 13 and 14 all ingredients are in δραχμαί, and in No. 16 all are in μυαί.

115) The color is quince-yellow, as opposed to κισσῶς, orange-tawny, ξανθός, gold, auburn, brownish-yellow, and κισσῶς, yellowish-red.

116) In order, 505,6; 9; 11; 14; 506,1; 5; 7; 12; 14; 507,1; 5; 8; 12; 15; 18; 509,1; 16; 511,9; 512,2; 9; 515,16; 516,9.

117) (οὐ Nos. 4, 7, 16, 21, 22; (οὐ Eucroth Nos. 1, 20; (οὐ σκώληκος Nos. 6, 10; (οὐ κισσῶς No. 17.

after litharge, again as in our text.¹¹⁸⁾ Resin, in some form, is found in 16 of the 22 $\mu\eta\lambda\iota\nu\alpha\iota$.¹¹⁹⁾ Oil is found in all of them, with two exceptions,¹²⁰⁾ and often $\epsilon\lambda\alpha\iota\omicron\upsilon\kappa\alpha\lambda\alpha\iota\omicron\varsigma$ is specified, although not in line 12 of our text.

Of the two ingredients which are lost from lines 11 and 12 of our text, one of them must have been wax, since 18 of the 22 $\mu\eta\lambda\iota\nu\alpha\iota$ have $\kappa\eta\rho\omicron\upsilon$.¹²¹⁾ It is provisionally supplied in line 12 (cf. note to the line, below). The other missing ingredient is more of a problem. Lines 10-12 have $\lambda\iota\theta[\alpha\rho\gamma\upsilon\rho\omicron\upsilon\psi\iota\mu\epsilon]-$
 $\theta\iota\omicron\upsilon\kappa\iota\tau\upsilon\lambda\upsilon\eta\varsigma\alpha[\pm 10]\ (\lambda\iota\tau.)\ \xi$. The lacuna must have held either the name of an ingredient beginning with alpha, plus $\acute{\alpha}\nu\alpha$, or $\acute{\alpha}[\nu\alpha]$ plus amount plus the name of an ingredient containing ca. 6 letters. Of the ingredients beginning with alpha among the 22 $\mu\eta\lambda\iota\nu\alpha\iota$, 10 have $\acute{\alpha}\mu\mu\omicron\nu\epsilon\iota\alpha\kappa\omicron\upsilon\ \acute{\alpha}\mu\mu\iota\kappa\omicron\tau\omicron\varsigma$,¹²²⁾ which is too long for the lacuna. No. 10 has $\acute{\alpha}\rho\iota\sigma\tau\omicron\lambda\omicron\gamma\iota\alpha\varsigma$, which is also too long, and No. 11 has $\acute{\alpha}\xi\omicron\upsilon\gamma\gamma\iota\omicron\upsilon$. Of ingredients containing ca. 6 letters among the 22 $\mu\eta\lambda\iota\nu\alpha\iota$, the only candidates are $\epsilon\upsilon\theta\upsilon\eta\varsigma$, $\lambda\iota\beta\acute{\alpha}\nu\omicron\upsilon$, $\omicron\iota\upsilon\upsilon$, $\delta\acute{\epsilon}\xi\omicron\upsilon\varsigma$.¹²³⁾

None of the 22 $\mu\eta\lambda\iota\nu\alpha\iota$ of Galen have all of the ingredients of our text. Of the ten recipes which call for $\iota\omicron\varsigma$ and $\lambda\iota\theta\acute{\alpha}\rho\gamma\upsilon\rho\omicron\varsigma$, e.g., not one calls also for $\psi\iota\mu\theta\iota\omicron\upsilon$. But among the thirty $\acute{\epsilon}\pi\omicron\upsilon\lambda\omega\tau\iota\kappa\alpha\iota$ of Galen, mentioned in B verso, note to lines 8-11, there is one (XIII 528,2ff.) which has all of our preserved ingredients except $\iota\omicron\varsigma$. It has the following: $\acute{\alpha}\lambda\lambda\eta\ \tau\epsilon\lambda\alpha\mu\acute{\omega}\nu\omicron\varsigma\ \phi\acute{\alpha}\rho\mu\alpha\kappa\omicron\nu\ \acute{\epsilon}\pi\iota\tau\epsilon\tau\epsilon\upsilon\gamma\mu\acute{\epsilon}\nu\omicron\nu$, $\kappa\omicron\iota\epsilon\iota\ \kappa\alpha\iota\ \pi\rho\acute{\omicron}\varsigma\ \acute{\alpha}\nu\theta\rho\alpha\kappa\alpha\varsigma$, $\acute{\alpha}\nu\alpha\eta\eta\rho\alpha\iota\upsilon\eta\iota\ \kappa\acute{\omicron}\lambda\pi\omicron\upsilon\varsigma\ \acute{\epsilon}\nu\iota\epsilon\mu\acute{\epsilon}\nu\eta\ \kappa\alpha\iota\ \acute{\epsilon}\gamma\chi\upsilon\mu\alpha\tau\iota\zeta\omicron\mu\acute{\epsilon}\nu\eta$, $\acute{\epsilon}\varsigma\tau\iota\ \delta\acute{\epsilon}\ \kappa\alpha\iota\ \acute{\epsilon}\pi\omicron\upsilon\lambda\omega\tau\iota\kappa\acute{\eta}\ \acute{\alpha}\gamma\alpha\theta\acute{\eta}$. "Another plaster, that of Talamon. It is a proved remedy. It is effective against carbuncles and when diluted and made into an infusion, it dries up fistulous ulcers. It is a good cicatrizing agent." The ingredients are $\alpha\iota\upsilon\theta\upsilon\eta\varsigma$, $\kappa\eta\rho\omicron\upsilon$, $\acute{\alpha}\tau\theta\acute{\epsilon}\varsigma\tau\omicron\upsilon$, $\lambda\iota\theta\alpha\rho\gamma\upsilon\rho\omicron\upsilon\ \acute{\alpha}\nu\alpha$ ($\delta\rho.$) ν , $\psi\iota\mu\theta\iota\omicron\upsilon$ ($\delta\rho.$) $\kappa\epsilon$, $\epsilon\lambda\alpha\iota\omicron\upsilon\ \kappa\alpha\tau\acute{\omicron}\lambda\eta\varsigma\ \acute{\alpha}\nu\iota\varsigma$. See the Table at the end of the commentary. The $\mu\eta\lambda\iota\nu\alpha\iota$ and other colored plasters which contain wax, resin, and oil, and large amounts of metals can also be $\acute{\epsilon}\pi\omicron\upsilon\lambda\omega\tau\iota\kappa\alpha\iota$.¹²⁴⁾

9. $\tau[\epsilon\lambda\alpha\mu\acute{\omega}\nu\iota\omicron\varsigma]$ or $\tau[\epsilon\lambda\alpha\mu\acute{\omega}\nu\omicron\varsigma]$: The remnant of ink is the left end of a horizontal stroke at the right height for a tau. The parallel text of Aëtius in XV, p.130 has $\acute{\alpha}\ \tau\epsilon\lambda\alpha\mu\acute{\omega}\nu\iota\omicron\varsigma\ \lambda\epsilon\upsilon\kappa\acute{\omicron}\nu\ \acute{\epsilon}\pi\iota\tau\epsilon\tau\epsilon\upsilon\gamma\mu\acute{\epsilon}\nu\omicron\nu$, $\kappa\omicron\iota\epsilon\iota\ \pi\rho\acute{\omicron}\varsigma\ \acute{\alpha}\nu\theta\rho\alpha\kappa\alpha\varsigma$, $\acute{\alpha}\nu\alpha\eta\eta\rho\alpha\iota\upsilon\eta\iota\ \kappa\acute{\omicron}\lambda\pi\omicron\upsilon\varsigma\ \acute{\alpha}\nu\iota\epsilon\mu\acute{\epsilon}\nu\eta$, $\acute{\epsilon}\varsigma\tau\iota\ \delta\acute{\epsilon}\ \kappa\alpha\iota\ \acute{\epsilon}\pi\omicron\upsilon\lambda\omega\tau\iota\kappa\acute{\eta}\ \acute{\alpha}\gamma\alpha\theta\acute{\eta}$.

118) Nos. 2, 3, 14, 15; in No.2 white lead is the last ingredient.

119) No.5 has $\pi\iota\tau\upsilon\lambda\upsilon\eta\varsigma$, as in line 11 of our text; Nos. 3, 18, and 19 have $\rho\eta\tau\iota\upsilon\eta\varsigma\ \pi\iota\tau.$ or $\rho\eta\tau.\ \pi\iota\tau.$ $\acute{\epsilon}\eta\rho\acute{\omicron}\varsigma$; Nos. 1, 2, 4, 7, and 17 have either $\kappa\omicron\lambda\omicron\omega\omega\eta\iota\alpha\varsigma$ or $\rho\eta\tau.\ \kappa\omicron\lambda.$; Nos. 14 and 15 have $\rho\eta\tau.\ \acute{\epsilon}\eta\rho\acute{\omicron}\varsigma$; Nos. 9, 10, 12, and 21 have $\tau\epsilon\rho\mu\iota\upsilon\theta\iota\upsilon\eta\varsigma$ or $\rho\eta\tau.\ \tau\epsilon\rho.$; while No.16 has $\tau\epsilon\rho.\ \delta\iota\alpha\upsilon\gamma\omicron\upsilon\varsigma$.

120) Nos. 9 and 12 have no oil.

121) Wax is omitted from Nos. 2, 8, 11, and 13. No.3 calls for $\kappa\eta\rho\omicron\upsilon\ \tau\upsilon\rho\rho\eta\eta\iota\kappa\omicron\upsilon$ and No.18 for $\kappa\eta\rho\omicron\upsilon\ \rho\omicron\nu\eta\tau\iota\kappa\omicron\upsilon$.

122) Nos. 1-3, 7, 9, 19, 14-17.

123) $\epsilon\upsilon\theta\upsilon\eta\varsigma$ Nos. 1, 4, 7, 9, 17; $\lambda\iota\beta\acute{\alpha}\nu\omicron\upsilon$ No.9; $\omicron\iota\upsilon\upsilon$ Nos. 5, 18; $\delta\acute{\epsilon}\xi\omicron\upsilon\varsigma$ No.21.

124) Cf. Gal. XIII 460ff., 489, 496ff., 503ff.

The addition of iron in our line 13, which both Galen and Aëtius omit, changes the φάρμακον λευκόν to a φάρμακον μῆλινον.¹²⁵⁾

10-11. λιθ[αργύρου ψαμ]θίου πιτυίνης ἀ[σβέστος ἀνά]: Galen and Aëtius have πιτυί- κηροῦ ἀσβέσ- λιθ- ἀνά. Cf. the Table of Ingredients and Amounts and notes to lines 9-15, 12.

11. ἀ[σβέστος ἀνά]: Cf. note to lines 9-15. Among the thirty ἐπουλωτικά of Galen, three have ἀσβέστος: that of Telamon (XIII 528,2; see Table); that of Moschion (528,13; see Table) which has the same ingredients as that of Telamon, except for the omission of resin and the addition of deer-marrow; and the "panacea" of Andromachus (531,15) which has all of the ingredients of that of Telamon, but in very different proportions, plus six additional ingredients.

ἀ[σφάλτου ἀνά], which is also possible in our text, occurs three times among the thirty ἐπουλωτικά but none of them has all of the preserved ingredients of our text.¹²⁶⁾ ἀσφάλτος did not occur in any of the twenty-two μῆλιναι, mentioned above.

12. [κηροῦ (λίτ.) .]: The amount of wax may very well have been 6 lbs., the amount equivalent to that of litharge, resin, and unslaked lime, as in the Galen and Aëtius recipes. Cf. note to lines 10-11, above. The supplement in this line is slightly shorter than those in the preceding and following lines, but the greater part of the foregoing numeral ζ is also in the lacuna.

13. [ζ]οῦ εὐκροῦ (οὔν.) [.: For ζοῦ see note to lines 9-15 and footnote 117, and cf. note to D, 11. Two of the μῆλιναι, that of Menoites (509,1) and that of Crito (515,16) have the amounts of iron in ounces, as in our text. The pertinent ingredients are added to the Table at the end of the commentary for comparative purposes.

ποῦ δὲ καί]: The supplement is illustrative. Cf. note to line 3, above.

14-15. The supplements are illustrative. Cf. the following: Gal. XIII 520,9, the κισσὸς ἢ Ἰοῦς (κισσὸς of Heras, ἢ διὰ δεικτῶν (cf. note to line 5, above, ad fin.), which has all of the ingredients of our recipe, except white lead and unslaked lime, for which other metals are substituted, has ποιεῖ ἐπὶ προσώτων ἐναιμῶν, βεσματικῶν, ποδὸς νεύρων διακοπῆς, παλαιὰ ἔλκη, ὑπόνομα, ... σπινθῶδες, ἀνθρακας, ... χιμῶδα, ἀποστήματα, ... βοθρίαντες, σκληροῦς ... θηρίων πληγὰς καὶ δῆγματα σκορπίων. "It is effective against recent bloody wounds, discharges of humours, breaks of tendons, long-standing, spreading, and septic ulcers, carbuncles, chilblains, abscesses, boils, indurations, injuries caused by beasts and stings of scorpions." Aët. XV. p.37-8, has a χλωρὰ καλλητικὴ ἢ δὲ ἀτρακτυλίδος (spindle-thistle), which is good for τὰ ἐναιμα τραύματα ἐν παντί ὅσῃ τοῦ σώματος γιγνόμενα ... καὶ πρὸς τὰ παλαιὰ ἔλκη καὶ ἐκκοπὰς καὶ πληγὰς καὶ χροῦσματα καὶ τὰ ἀπὸ ψύξεως ἐπαλγῇ,

125) Cf. Gal. XIII 496-7, and note to lines 9-15, above.

126) Nos. 5, 14, and 15 (525,10; 529,9,13) have no white lead or resin.

"for bloody wounds present on any part of the body, and for old ulcers, excisions, injuries, beatings, and painful conditions from (excessive) chilling;" p. 42 has an ἐμπλαστὸς ἡ ἑστία: αὕτη ποιεῖ πρὸς πᾶν τραῦμα ὡς οὐκ ἄλλο φάρμακον καὶ πρὸς νευροτρότους ... ποιεῖ πρὸς τὰς τῶν ἰοβόλων πληγὰς. "The plaster Hestia: this is effective against every wound as no other medication, and against injuries to the tendons. It is good for wounds caused by venomous animals." P. 48-9, a κηρὸς of Halius, has αὕτη ποιεῖ πρὸς τὰ ἐναιμα τῶν τραυμάτων ... ἐπὶ τῶν κυνοδήκτων καὶ ἀνθρωποδήκτων. ἀκρως ποιεῖ καὶ πρὸς τρυγόνων θαλασσιῶν καὶ δρακόντων καὶ τῶν ἄλλων χαλεπῶν ἰχθύων πληγὰς, καὶ καθόλου δὲ συνάμεινε θαναταίῃς ἔστιν. "This is effective for bloody wounds and for those bitten by dogs or by humans. Above all, it is good for the strikes of sting-rays of the sea, serpents, and other dangerous fish. It has altogether a wonderful power." Cf. p. 50.15ff.

Table of Ingredients and Amounts

	Mich. Inv. 21 E, 9-15	Gal. XIII 528.2	Aët. XV p. 130	Gal. XIII 528.15	Gal. XIII 509.1	Gal. XIII 515.16
litharge	6 lbs.	50 dr.	8 dr.	8 dr.	4 lbs.	4 lbs.
white lead	6 lbs.	25 dr.	25 dr.	8 dr.		
pine resin	6 lbs.	50 dr.	8 dr.		2 lbs.	8 oz. (= 2/3 lb.)
unsalaked lime	6 lbs.	50 dr.	8 dr.	8 dr.		
oil	6 lbs.	50 dr. ¹²⁸⁾	50 dr. ¹²⁹⁾	enough	1 lbs.	2 Eē. (= 1 lb.)
wax	[6 lbs.] ¹²⁷⁾	50 dr.	8 dr.	16 dr.	1 lb.	4 lbs.
iron rust	[] oz.				4 oz. 1 = 1/3 lb.	8 oz. (= 2/3 lb.)

The ratio of the ingredients of ■ E, 9-15, to those of the Telamon recipe of Galen (528.2) is 12:1, with the exception of white lead.¹³⁰⁾ In the Telamon recipe of Aëtius (XV, p. 130), which should be an exact duplicate of that of Galen (cf. notes ■ lines 9-15, ad fin., 9, and 10-11), the text has an obvious

127) For the probable amount of wax in E as 6 lbs., see the note to line 12, above.

128) The Telamon recipe of Galen has ἐλαίου κοτύλης ἡμίση (= one-half pound = 50 dr.). For the rounding out of 48 dr. to 50 dr., see 21 ■, footnote 9; and for 1 kotyle = 1 pound = 12 ounces, see ■ verso, footnote 78.

129) The Telamon recipe of Aëtius has ἐλαίου λίτραν ἡμίση. See the preceding footnote.

130) White lead is frequently found having the same amount as litharge: cf. A, 10-11, and Nos. 14 and 15 of the 22 ἀήλιναι (507.15, 18), and nine of the 30 ἐπουλωτικά (525.2; 526.7-17; 527.12-13; 528.15; 529.16; 530.18; 533.1; 12). In another of the ἐπουλωτικά (533.5) the amount of litharge is 100 dr., and of white lead, 50 dr., the same ratio as in the Telamon recipe in our Table.

error, with apparently no MS variation. The scribal blunder in a single numeral, H in place of N 1 = B in place of 50), has resulted in false amounts for four ingredients.

The two $\mu\eta\lambda\iota\nu\alpha\iota$, that of Menoites and that of Crito (509,1; 515,16), are added to the Table as examples of the relative proportion of iron to the other ingredients.¹³¹⁾

Inv. 21 E verso

9.3 x 13.5 cm.

.αν..[
]ανου (οὖν.) α ῥοδί-
 (νου κοτ() .) μαρουλίου (οὖν.) γ
 (ALT. 1)
 4 [κηροῦ ..] (οὖν) δ τέλει-
 (ως ..) (τ)έας δίζζης (λίτ.) ζ
 [κολοφωνί]ας (οὖν.) η βάλε
 [τῆλιν καὶ] δίζζαν (τέας
 8 [ἐκπεπικ]ευμένην [εἰς] ἔλεον
 τὸ
 [ἐπὶ δὲ πῶ]ρ ἔωε μέχρι δν ὅ-
 [πολειωθῇ] διακτύλουε θ
 [Ἐποῶ δὲ ἐπι]πάσσων (εἰς) χυ-
 12 [λὸν καὶ συνε]γώσας ἐπ' ὀθονί-
 [ον διηθήσας] καὶ στήσας
 [..]οντ..[...]
 [..]μαλα[
 16 [..]

Plate 5b

3,6. Pap. 5. δίζης 7. δίζαν 8. ἔλεον

↑

Translation

... 1 ounce of rue (?). ... kotylae of rose oil, 3 ounces or pounds of lettuce, ... of wax, 4 lbs. of iron rust, ... of fenugreek, 8 lbs. of willow root, 6 oz. of kolophonian resin. Add the fenugreek and the expressed juice of willow root to the oil and boil over a fire until four "fingers" are left remaining. Then sprinkle the dried ingredients over the liquid, mix together and strain through a linen cloth. Raise it ...

¹³¹⁾ Not included in the Table are several ingredients which do not appear in our text: deer marrow in the $\epsilon\pi\omicron\upsilon\lambda\omega\tau\iota\kappa\eta$ of Moschion (528,15); frankincense, all-heal, and ammoniac incense in the $\mu\eta\lambda\iota\nu\eta$ of Menoites (509,1); and vinegar in the $\mu\eta\lambda\iota\nu\eta$ of Crito (515,16).

1. This line and preceding lines probably contained the first ingredients of the current recipe. Cf. note to line 4.

2. [ανου: πηλάνου, rue, is the most likely ingredient here; cf. C, 7. But other ingredients cannot be excluded.¹³²⁾

2-3. ῥοδί[νου: sc. ἐλαίου. Cf. ἔλεον in line 8. For rose oil used in plasters see B verso, 2, where ἐλαίου is also omitted, and H, 4. After ῥοδί[νου there is space for 4 letters before μαρούλιου. For oil measured in κατύλαι see B verso, 11; D, 14, with note ad loc.; L, 4; and for λίτραι, E, 12.

3. μαρούλιου + θριδάκος or θριδάκινος, lettuce. The word has not occurred in papyri and was seemingly not known prior to the fourth century. For references to μαρούλιον and μαρούτιον, both with variant endings, cf. LSJ, s. vv.; Hesychius, ed. J. Albertus, s.v. θριδάκιναι, with notes 4 and 5; DuCang. Gloss. Gr., s.v. μαρούλιον, with copious, very informative notes.

Alexander Traillianus, writing in the sixth century, has μαρούλια as an equivalent of θριδάκιναι and as a separate vegetable (or vegetables) apart from θριδάκιναι. Cf. II 61.6, where a simple diet includes μαρούλια καὶ θριδάκιναι καὶ ἔντυθα, rendered by the editor, T. Puschnann, "Marulia-Salat, Lattich und Endivien"; while II 593.18 has τὰ ἔντυθα καὶ τὰς θριδάκιναις τὰ καλούμενα μαρούλια, "Endivien und den sogenannten Marulia-Salat." μαρούλια is thus an inclusive word, designating a number of leafy "greens" which are commonly used in salads. Cf. Geop. 12.1.2, μαρούλια διάφορα, "different kinds of lettuce," which are to be planted in February, along with leeks, onions, beets, etc.¹³³⁾

Although Galen, writing in the second century, says that all the Greeks "now" reserve the word θριδάκινη for wild lettuce.¹³⁴⁾ and although μαρούλιον is equivalent to θριδάκινη, the word μαρούλιον is not used for wild lettuce. In DuCang. op.cit., τρώμιον (τρωέ-) is cited as equivalent to τὸ ἀγρίον μαρούλιον or τὸ ἀγριομαρούλιν, and εἶσις¹³⁵⁾ as equivalent to τὸ μικρόν, ἄτοι τὸ ἀγριομαρούλιν.

132) Cf. Gal. VI 638 for πήγανον, ῥοίγανον, and κορίανον as plants with the same properties as κόσμουα, εκδρόσα, ποάα, et al. λίβανος is found in a powder for gout in Alex. Trall. II 545, which also contains ἴέα and τήλις among its forty-nine ingredients.

133) μαρούλια διάφορα is followed by τρυτέτι, δικάοδιν, φρυγιατικόν, δειγτανόν, καὶ κόμβη λευκή, κτλ. In LSJ δικάοδιν = "a kind of lettuce"; φρυγιατικόν, "an unknown plant"; and δειγτανόν, the "name of a plant." φρυγιατικόν may perhaps be a Phrygian-type lettuce.

134) Gal. XIII 387, ὁ τῆς θριδάκινος χυλός, ὁ τε τῆς ἀγρίας καὶ τῆς κηπευομένης, ἣν πάντες οἱ Ἕλληνες οἱ νῦν οὐ θριδάκινην, ἀλλὰ θρίδακα προσαγορεύουσι, τὴν ἀγρίαν μὲν θριδάκινην ἀνομάζοντες. Cf. also VI 626-7, 794; XII 509. (I owe the references, with many thanks, to Ann Ellis Hanson). Dioscorides, writing in the first century, uses only θρίδαξ, ἀγρίας or ἡμερος (II 136). In his list of "simples" Galen likewise has only θρίδαξ and θ. ἀγρία (XI 887), as do also Aëtius (I 165) and Paulus (VII 3).

135) I.e. εἶσις ἀγρία. Cf. Dsc. II 132 and 107.2; Gal. VI 794 and XII 119. Cf. also D verso, 3, of our codex.

For a drawing of $\theta\pi\iota\delta\alpha\epsilon\ \lambda\upsilon\epsilon\tau\tau\omicron\varsigma$ = $\mu\alpha\pi\omicron\upsilon\lambda\iota\omicron\nu$ and of $\theta\pi\iota\delta\alpha\epsilon\ \acute{\alpha}\gamma\omicron\iota\alpha$ = $\acute{\alpha}\gamma\omicron\iota\omicron-\mu\alpha\pi\omicron\upsilon\lambda\iota\omicron\nu$, see *The Greek Herbal of Dioscorides*, translated by John Goodyear (1965), ed. R.T. Gunther (1934) with illustrations by a Byzantine artist (ca. 512 A.D.), pp. 176-177.

In Modern Greek the word for lettuce is $\mu\alpha\pi\omicron\upsilon\lambda\iota$, τό, with compounds $\mu\alpha\pi\omicron\upsilon-\lambda\omicron\epsilon\pi\omicron\upsilon\sigma\omicron\varsigma$, $-\phi\upsilon\lambda\lambda\omicron$, $-\sigma\alpha\lambda\acute{\alpha}\tau\alpha$. $\theta\pi\iota\delta\alpha\epsilon$, ὁ, is also used, but primarily as a botanical designation.¹³⁶

The amount of lettuce at the end of line 3 of our text is $\Gamma\omicron\ \gamma = 3$ oz. But immediately beneath $\Gamma\omicron$, and touching it, the scribe has placed the symbol for lbs., \uparrow , as if he had omitted of $\delta\epsilon$ (λίτ.) γ which was in his exemplar. Cf. D, 14. Our scribe was again careless in line 11 where he dropped two letters from the text.

4. [$\kappa\eta\pi\omicron\upsilon$...] $\iota\omicron\upsilon$: The supplement is illustrative, based on the recipe for a plaster called ἡ $\delta\iota\acute{\alpha}$ $\iota\tau\epsilon\omega\nu$ which is found in Gal. XIII 740; 800; Aët. XV, p. 60; Paul. VII 17.43. All of the recipes have the same 15-17 ingredients, but with varying amounts. They include $\acute{\epsilon}\lambda\alpha\iota\omicron\nu$, $\kappa\eta\pi\omicron\upsilon$, $\iota\omicron\upsilon$, $\iota\tau\epsilon\omega\varsigma$ and $\mu\omicron\lambda\omicron\phi\omega\nu\iota\alpha\varsigma$ ($\iota\sigma\tau\iota\upsilon\nu\epsilon$), but have nothing corresponding to our $\iota\alpha\nu\omicron$, $\mu\alpha\pi\omicron\upsilon\lambda\iota\omicron\nu$, or $\tau\eta\lambda\epsilon\omega\varsigma$ (lines 2-4).

4-5. $\tau\eta\lambda\epsilon\omega\varsigma$: For $\tau\eta\lambda\epsilon\omega\varsigma$, fenugreek, see Dsc. II 102; Gal. XII 741. For its occurrence in medical papyri see Marganne, p. 371.

5. $\iota\tau\iota\lambda\iota\alpha\varsigma$ $\delta\iota\zeta\eta\varsigma$ ($\delta\iota\zeta\eta\varsigma$), root of willow. For juice of willow and for the uses of the various parts of the willow tree, see D verso, 9, note. Galen seemingly has no instance of the use of the root of willow. But Alexander Trallianus, II 545, 9, cites a decoction, $\acute{\omega}\phi\theta\upsilon\mu\alpha$ $\delta\iota\zeta\eta\varsigma$ $\iota\tau\epsilon\omega\varsigma$ $\phi\lambda\omicron\iota\omicron\upsilon$, to be used in medications for gout after the inflamed parts have begun to perspire from other medication. And Aëtius includes the root of willow in a list of common emetic aids to be used in cases of dysentery (IX 42, 312, in Athena 23, 1911, 388, 6). I owe with thanks a computer printout of all the examples of $\iota\tau\epsilon\omega$ in Aëtius and Paulus to Ann Ellis Hanson. Cf. B verso, footnote 97.

6. [$\mu\omicron\lambda\omicron\phi\omega\nu\iota\alpha\varsigma$]: The supplement is illustrative; see note to line 4, above. [$\iota\sigma\tau\iota\upsilon\nu\iota\alpha\varsigma$] is also possible. It is a frequently found ingredient in the plasters for ulcers, either by itself or with $\epsilon\chi\iota\sigma\tau\eta\varsigma$, $\epsilon\pi\omicron\gamma\gamma\upsilon\lambda\eta\varsigma$, or $\acute{\upsilon}\gamma\omicron\delta\epsilon$. Both $\epsilon\tau\omicron\nu$, $\epsilon\chi\iota\sigma\tau$, and $\epsilon\tau\omicron\nu$, $\epsilon\pi\omicron\gamma$, are included in the recipe, ἡ $\delta\iota\acute{\alpha}$ $\iota\tau\epsilon\omega\nu$, mentioned in the note to line 4. Also included is $\mu\epsilon\lambda\alpha\nu\tau\eta\pi\omicron\iota\alpha\varsigma$ which is too long for the lacuna in our text.

6-10. $\beta\acute{\alpha}\lambda\epsilon$... $\delta\iota\alpha\kappa\upsilon\lambda\omicron\nu\varsigma$ ὁ: For the supplements cf. Gal. XIII 741, 6ff., where the directions for making the dark plaster with willow, $\mu\epsilon\lambda\alpha\iota\nu\alpha$ ἡ $\delta\iota\acute{\alpha}$ $\iota\tau\epsilon\omega\nu$, include the following: $\tau\acute{\alpha}$ $\phi\upsilon\lambda\lambda\alpha$ $\tau\eta\varsigma$ $\iota\tau\epsilon\omega\varsigma$ $\epsilon\iota\varsigma$ $\delta\acute{\epsilon}\xi\omicron\varsigma$ $\beta\alpha\lambda\omega\nu$ $\kappa\alpha\iota$ $\theta\epsilon\iota\varsigma$ $\epsilon\nu\tau\iota$ $\tau\acute{\omicron}$ $\pi\omicron\theta\omicron$ $\acute{\epsilon}\psi\epsilon$, $\kappa\epsilon\nu\acute{\alpha}\nu$ $\sigma\upsilon\nu\epsilon\chi\omega\varsigma$ $\acute{\epsilon}\omega\varsigma$ $\tau\acute{\omicron}$ $\tau\epsilon\iota\tau\omicron\nu$ $\tau\acute{\omicron}$ $\acute{\upsilon}\gamma\omicron\phi$ $\acute{\omicron}\pi\omicron\lambda\epsilon\iota\omega\delta\eta$. "Add the willow leaves to the vinegar, place over a fire and boil, stirring continuously,

¹³⁶ Cf. W. Crighton, *Μεγά Ἑλληνιστὶ Ἀγγλικὸν Λεξικόν*, 1960. In the English-Greek section of Cairy's *Modern Desk Dictionary*, 1971, $\lambda\epsilon\tau\iota\varsigma$ is given, as well as $\mu\alpha\pi\omicron\upsilon\lambda\iota$, s.v. lettuce; but $\lambda\epsilon\tau\iota\varsigma$ is not found in the Greek-English section.

until there is left remaining one-third of the liquid." The directions for the willow recipe on p. 800, 16, have τὰς ἱτέας καὶ ὄξους ἕως λευφῶσαι ἔσται ὃ ἔψα, εἴτα ἰψ̄ προλελειστοῖσιν καὶ σιμυθίῳ καὶ μελανινοῖς ἐπιβάλλει τὰ φύλλα καὶ συλλελοιτοῖσιν, εἴτα τὰ ξηρὰ λεῖα καὶ πάλιν χύλωσιν, εἴτα τὰ τμητὰ ἐνικατάχει. "Boil the willow leaves with the vinegar until two sextarii remain, then add the leaves to the previously finely pounded iron, the white lead and black pigment, and triturate together. Then make into a liquid again the dried and pounded ingredients and pour over the melted ingredients."¹³⁷

Aëtius gives the method for extracting the juice from the leaves (XV, p. 61, 9): They are first pounded in wine, then ἐψησας ἐπὶ πυρὸς μαλακῶς ἐπὶ πλείονα χρόνον, δειήθει δι' ὀδῶντος πυκνῆς, καὶ ἐκπιέσας τὰ φύλλα ῥήντε, τὸν δὲ χυλὸν φέλατε εἰς τὴν σκευασίαν. "Boil over a low fire for some time, then strain through a closely-woven linen cloth and press out the juice. Discard the leaves and save the liquid for the preparation of the recipe."

For τήλις and ῥίζα ἀλθαίας boiled in oil, cf. Aët. XV, p. 15, 16-17, a plaster for indurations, ἐναρξῶς δ' ἐνίστα τῷ ἔλαιῳ καὶ τήλιν καὶ ἀλθαίας ῥίζαν, κτλ., "sometimes I boil down fenugreek and the root of marsh mallow in oil." Another recipe of Aëtius, p. 73, ἡ δὲ τῆς ἀλθαίας πόλητος, calls for the bark of the root of marsh mallow and gives directions for extracting the juice from it. The bark is taken at the height of the flowering season, pounded fine, and marinated in white wine for three days. The final direction (line 6) is ὀλμοκοπήσας πάλιν, ἐκπιέσας δι' ὀδονίου τὸν χυλὸν ἱχυρῶς. "Pound again in a mortar and squeeze out the juice forcibly through a linen cloth."

8. (ἐκπεριελεμίνην: Also possible is (ἀλθαίας)εμίνην. Cf. Paul. VII 17, 23, a recipe for a plaster containing ῥακοντίου ῥίζα, root of edder-wort. The direction for preparing it is ἡ ῥίζα ξηρὰ λεῖα τοῖς ἄλλοις ἐπιπάσσεται λυθεῖσιν, "the root is dried, pounded, and sprinkled over the other dissolved ingredients." Another recipe of Paulus, No. 30, has the following: τοῦτοις τακεῖσιν ἐπιπάσσειν τῆς πορφυρᾶς ἀρκούσης τῆς ῥίζης ξηρᾶς λειοτάτης (οὖν.) ὃ. "Sprinkle over the melted ingredients four ounces of dried and finely pounded root of purple alkanet."

10. ὀκτωῦλας: The word is here used as a measure equalling a finger's breadth, or approximately seven-tenths of an inch (LSJ, s.v., 11, with references). Cf. Gal. XII 952, 6, (πρὸς δευτέρᾳ) δουόλει καὶ δευτὸς δ' ἐπὶ τὰ ὅσα μετὰ μίνθης κλωνίων. ἔστω δὲ τοῦ μὲν δευτὸς πλεῖστος δευτὸς τοῖς τοῖς δακτύλοις, τῆς δὲ μίνθης κλωνία τοία, κτλ. "For ophthalmia¹³⁸ a suitable treatment is sumach, that used for cooking, with twigs of mint. Let the amount of sumach be rather more than (can be taken) in three fingers, and that of mint three twigs." Cf. Aët. XV, pp. 32, 11; 107, 14.

¹³⁷) The uses for these recipes are given in D verso, 9, note.

¹³⁸) See D verso, note to lines 2-3.

A fragment from a roll of medical recipes of the Hellenistic period also measures by fingers. P.Ryl. III 531, 13f. has ποός τοῖς ἀπὸ τῶν ὑστερῶν πνιγμοῖς ἐνύδριδος τοῖς νεφροῖς ξηρῶνας δίδου ὅσον τοῖς τριεὶν δακτύλοις λαβεῖν ἐν οἴνῳ εὐώδει. "For hysterical choking, give dried otter's kidneys, as much as can be taken in three fingers (= 'a pinch'), in fragrant wine."

11-12. (ξηρὰ δὲ ἐπιπλάσων (εἰς) χυλόν; Cf. Aët. XV, p. 108,4, the brief direction for making up an anodyne recipe: τῆξας τὰ τηκτὰ ἐπίπασσε τὰ ξηρὰ λειότατα, "melt the soluble ingredients and sprinkle over them the finely pounded dry ingredients." The final direction for a cicatrizing plaster of Andromachus, Aët. XV, p. 113,10, is the following: καὶ ὄρας ἀπὸ τοῦ πυρός ἐπίπασσε τὰ ξηρὰ λειότατα γενόμενα, καὶ μαλάξας χρῶ. "Lift it from the fire, and sprinkle over it the dried ingredients which have been finely pounded. Make it supple and use." Cf. also the final direction for the recipe on p. 75, 9: καὶ ὄρας ἐπίπασσε τὴν θάλασσην καὶ τὸ χαμαίμηλον, καὶ ἐνώσας ἐπὶ χειρὶ εἰς σὺλιν ὕδωρ ἔχουσαν θυρόν, καὶ μαλάξας χρῶ. "Raise it (from the fire) and sprinkle over it the (dried) shepherd's purse and camomile. Mix and pour into a mortar holding cold water. Make it malleable and use."

12-13. ἐπὶ ὀδονίῳ (ὀνηθήσας; δὲ) ὀδονίου is expected here, as, e.g., in Aët. XV, p. 70,20, ἔως μέλει πάχος ἱκανὸν λαβῆ, καὶ ὀνηθήσας ἐπὶ ὀδονίου χρῶ εἰς τὴν τοῦ σαρμάκου σκευασίαν. "Boil until it takes on a proper consistency. Strain through a linen cloth and use in the preparation of the medication."

13. στήσας; Cf. Aët. XV, p. 44, 15ff.: καὶ ὀνηθήσας ὡς καθαρὸν αὐτὸ γενέσθαι, στήσας τὰς δύο λίτρας, ἐπίβαλλε τοῖς ἐν τῇ σὺλῃ, "having strained (the akunge) until it becomes clean, raise the two pounds and add them to the ingredients in the mortar."

14.]..ξοντ..[.]: possibly] τῆξον τηκτὰ; see Gal. XIII 788,13. τὰ δὲ τηκτὰ ἐν ἑτέρῳ ἀγγεῖῳ τῆξον, προσέψας κτλ. "Melt the soluble ingredients in another vessel, having previously boiled them."

15.]..μαλα[: possibly καὶ μαλάξας χρῶ. See note to lines 11-12, above.

P. Mich. Inv. 21 F

7.5 x 11.5 cm.

Plate 6a

) ἐστὶν α[± 6]
 [...]...ταστέ [± 6]
 λου καὶ διὰ κλυ[μάτων (ἀ-)]
 4 εἶται παρελθόντα [τοῖς πῶ-]
 νοῦς τῶν ἐντέροις [κλήων]
 ποιῆ δὲ πρὸς ἀποστήματα
 καὶ δοθιόντας καὶ (πρὸς ἐμ-)
 8 πνευματώσεις τε [καὶ γαστ-]
 λα 777(7)
 ἔμπλαστρος ἁ ψών[ις καὶ]
 κολλητικὴ καὶ συ[νολωτικὴ]
 12 ἑλκῶν καὶ φλεγμ[ονῶν ἐπει-]
 σάν ταπεινά εὐφραίνει κη-
 ρατῆς ἐπὶ ὑγρότε

6. κολλε 7. καὶ δοθιόντας 8. πνευματώσεις 10. ἔμπλαστρος

Translation

... It is a good discutient (?) plaster, effective for other conditions of the same kind (?) and with spongewashings it is healing, taking away the pains of intestinal hernias. It is also good for abscesses, boils, abnormal inflations, and chilblains.

The date-palm plaster agglutinates and promotes cicatrization of ulcers and (is a treatment for) inflammations when, having been melted, it has the consistency of a moist cerate. ...

1-9. These lines contain the uses, or additional uses, of a preceding recipe. They are reminiscent of the affections treated by Galen in his *Περὶ τῶν παρὰ φύσιν ὄγκων*, "On abnormal swellings" (VII 705-732).¹³⁹ Cf. esp. pp. 718-719 for ἀποστήματα and πνευματώσεις (see lines 6 and 8, above). A recipe of Aëtius. ἁ διὰ γύρωε, "the plaster with finest meal" (XV, p. 85),

¹³⁹ Translations are found by D.G. Lytton and L.M. Resuhr in the *Journal of the History of Medicine* 33, 1978, 531-549, and by J. Reedy, University of Michigan Doctoral Dissertation, April, 1968.

has ποδὲ ἀποστήματα καὶ δοδύληνας ποιοῦσα καὶ ποδὲ ἐντεροκήλας κτλ. (cf. lines 5-7, above).

1. An illustrative supplement might be the following: διαπορονητικὴ δ' ἔστιν καὶ αἵμα, καὶ πλεονεχία τὰς ἐνέροις (sc. διαπορονητικῇ) τοῦ γλῆτος, "It is a good discutient plaster: it is effective for other conditions of the (same) kind." Cf. Aët. XV, p. 100, where a plaster is described as διαπορονητικὴ ἀποστημάτων ποδῶδες, "the wondrous dispersing plaster for abscesses." If the letter following ἔστιν is the vowel eta, the text may have had ἡ [αῦτη. Cf. A, 13.

1-4. διὰ κλύου (μάστιγος) ἢ διὰ κλύου καὶ ὕδατος, "either with applications or gentle washings." The washing-liquid is made of honey, oil and water, but if a biting (δὴξίς) is present a suitable application is a mixture of Sabinum-oil, goose fat, and wax. Galen continues (577-578) τὰς δὲ ἐννευματώσεις ἰσχυρὰ συνάγουσιν τῇ ἐλαίᾳ κινάμου καὶ τοῦ καὶ τῶν ἀπορῶν σπασμάτων καλίνου καὶ κυλίνου καὶ παρόδου καὶ σίκερος, ὅσα τ' ἄλλα τοιαῦτα. "To heal abnormal inflation, boil together in oil, rue and non-flatulence-producing seeds, those of celery, cummin, fennel, stone parsley and other such seeds."

ἰσχυρὰ is a likely supplement here, although ἰσχυρὰ would be more usual. Cf. A, 13 and B verso, 4. The verb must be short and the only alternative would appear to be λυῖται, in which case the subject could not be "the plaster" or "application."

5. ἐντεροκήλων, intestinal hernias: The curved left half of omicron is on the broken edge of the papyrus. Beneath it is an oblique stroke, 2 mm. to the right of the tail of rho, but possibly intended to mark the abbreviation ἐντεροκλῶν,¹⁴⁰ sometimes used alone to designate bowels, intestines, or stomach. The doubtful omicron could also be part of an omega, in which case ἐντεροκλῶν was written out and perhaps followed by καὶ. I incline to think the oblique was accidental, since ἐντεροκήλας is found with two of the succeeding ailments in our text, ἀποστήματα and δοδύληνας, in Aët. XV, p. 85 (cf. note to lines 1-9, above). On recipes for intestinal hernias see Aët. XV, p. 85; Paul. III 53; Orib. Fr. 85 (IV 60), 14). Cf. Celsus VII 18.3 for a description of the condition which "the Greeks call enterocelen et epiplocelen, apud nos indecorum sed commune his hirneae nomen est."

6. ἀποστήματα, abscesses: Cf. note to lines 1-9, above. Possible also, but less likely, is ἀπορῶματα, bruises, excoriations, minor ulcers. Cf. Gal. XIII 399, 16; 417, 18; Paul. IV 14; VII 17, 16.

7. καὶ = καὶ. So spelled in C verso, 8; D verso, 7, 11. For καὶ in the same text (and line) with καὶ, see ZPE 27, 1977, 141, note to lines 5-6.

¹⁴⁰ An oblique after rho, to mark an abbreviation, is usually found through the tail of rho, and slanting down from right to left rather than from left to right, as here.

δοθιῶνας (δοθιῶνας) = δοθιῶνας, small abscesses, boils. See L53, s.v. δοθιῶν, for the spelling in the first and second centuries. Cf. Paul. IV 23 περὶ δοθιῶνων, καὶ ὁ δοθιῶν ὅγκος ἐστὶν ἀποστήματός ἐκ παχέων χυμῶν ἐν τοῖς σαρκώδεσι μάλιστα τοῖσι συνεισόμενος, κτλ. "A dothiēn is an abscess-type swelling formed of thick humours especially in the fleshy parts of the body."¹⁴¹ Particularly recommended is the application called "the Dothiēnicon"¹⁴² (cf. VII 17.10, ἡ δοθιῶνη). δοθιῶνες are found together with ἀποστήματα and ἐντεροκῆλαι, et al. in Aët. XV, p. 85, and together with ἀποστήματα and χιμείλα, et al. in Gal. XIII 778, 15.

7-8. καὶ [πρὸς ἐμπνευματώσεις (ήντες)]. Nine letters in the lacuna, as e.g. [ἔρρηται καὶ] or [σπίρους καὶ], herpes or hardened tumors, would probably make the line too long.¹⁴³

ἐμπνευματώσεις and πνευματώσεις seem to have been used interchangeably by the medical writers. For a definition of ἐμπνευματώσεις see Gal. XIX 419, ὁσος ἰατρικὸς 258; and cf. Orib. Coll. inocr. 46 (IV 557, 23) περὶ ἐμπνευματώσεως πρὸς αἵματος Coll. inocr. 59 (574, 7) περὶ πνευματώσεως; Paul. III 70 περὶ ἐμπνευματώσεως (μήτραι). For medications, see e.g. Dsc. Eupor. II 12; Gal. VIII 389, 14; XIII 473, 11; and cf. notes to lines 1-9 and 3-4, above.¹⁴⁴

8-9. [καὶ χιμείλα, chilblains: For the supplement see note to line 7, above, ad fin. The word is both neuter and feminine and spelled with either tau or theta. It is found again in our codex in H verso, 5, τὰ χιμείλα, with τ corrected from θ. Cf. Paul. III 79.1 πρὸς χιμείλα καὶ τὰ ἐν κλάματι καὶ κίτωνασι. τὰ χιμείλα ἐλκώδεις εἰσὶ διασθέντες περὶ τοῦ δακτύλου τὸν χειρὸς καὶ ποδὸς συνεισόμενα χιμῶνες ὁμ. "On chilblains and affections of the feet and heels. Chilblains are ulcerous conditions forming on the fingers and toes in the winter season." Many remedies follow and are continued in 79.2, Μαρκιλλίων πρὸς χιμείλα, where the app.crit. has χιμείλαν AEN, χιμείλαν M, -v eras. B. Dsc. Eupor. I 171 has χιμείλα ὅθι ἴσται κατανιλούμενα: κτλ. The variant spellings of the MSS are χιμείλα, χιμείλα, χιμείλα (i super-scr.), Oribasius prefers the spelling with theta. Cf. Coll. Med. inocr. 102 (IV 615, 19) πρὸς χιμείλας κακοήθεις: ... ἐπὶ δὲ χιμείλων κτλ.; inocr. 109 (IV 620) περὶ χιμείλων; Syn. VII 45 (V 391) πρὸς χιμείλα: also Gal. XIII 380, 5 ἐν χιμείλοις; 383, 17 τῶν ἐλκωθέντων χιμείλων.

10. A new recipe begins in this line. The line was not indented, nor a space left before it; but there is a short paragraphos beneath the two letters of line 9 and the remainder of the line is filled with elaborated forked

¹⁴¹ Cf. Orib. Coll. XLIV 32-33 (III 673-675), Syn. VII 41 (V 385).

¹⁴² In the app.crit.: δοθιωνικόν ADE, δοθηνικόν F, δοθιονικόν GHKM, e corr. B.

¹⁴³ These affections are the shortest of those listed in Gal. VII 718-719, together with ἀποστήματα and πνευματώσεις, et al. Cf. note to lines 1-9, above.

¹⁴⁴ I owe to Ann Ellis Hanson, with many thanks, a computer printout of all the examples of ἐμπνευματώσεις in Galien.

paragraphoi. The new recipe is "the phoinikinē" or date-palm plaster. It is a well-known recipe found in the ancient medical writers. Our text is taken almost verbatim from Gal. XIII 375: περί τοῦ διὰ χαλκίτεως ἐπιλάστω φαρμάκου, τίνι λόγῳ συνέσθηκα τὴν διὰ χαλκίτεως ἐπιλάστρον, ἣν φοινικίνην ὀνομάζω, κολλητικὴν τε καὶ συνουλωτικὴν ἐλκῶν καὶ φλεγμονῶν θεραπευτικὴν, ἐπειδὴν τακτεῖσα εὐστασίῳ ὕγρῳ ἔχῃ κηρωτέα, κτλ. "Concerning the medicated plaster with copper. I have made up in the following way the plaster with copper, which I call 'the date-palm', which agglutinates and promotes cicatrization of ulcers and is a treatment for inflammations when, having been melted, it has the consistency of a moist cerate."

Our text breaks off at that point, but, alone among the six fragments, 21 A-F, the text can be shown to have continued onto the verso side.¹⁴⁵⁾ with the list of ingredients and amounts lost at the bottom of F or the top of F verso. The verso is in truly horrendous condition and, without the description of the preparation of the recipe in Galen very few letters could have been read with any certainty. See F verso, 2-6 and notes ad loc.

In addition to Gal. XIII 375 ff., the recipe is found in Orib. Syn. III 5 (V 97-98); Aët. XV, §. 44-45; and Paul. VII 17.29. Orbasius and Aëtius call their recipe ἡ φοινικίνη φαρμάκω and repeat or paraphrase in some detail the minute directions of Galen. Paulus calls his recipe simply ἡ φοινικίνη and the recipe and directions together require only six lines. The ingredients are the same in all of the texts: 2 lbs. of suet, 3 lbs. each of oil and litharge, and 4 oz. of copper.¹⁴⁶⁾ Paulus gives the order of the addition of the ingredients in a mortar (κύβητος) and concludes his recipe with the following: καὶ μετὰ τὸ καλῶς λιωθῆναι ἔσται ἐπὶ μάλα μικρῷ πυρρῷ ἕως ἀπολύντου πνοῆς (ὡς τὰς τῶν φοινίκων δάσδεα). "After the ingredients are well pounded, boil over a low fire until it ceases to stain, stirring with branches of date-palm." Cf. F verso, 1 ff.

12. καὶ φλεγμονῶν: Galen has κ. ο. θεραπευτικὴν (375, 4), and, at the end of the recipe where its uses are delineated (380, 3), ἐπὶ τῶν φλεγμονῶντων (ἐλκῶν), "inflamed ulcers." Cf. Orib. Syn. III 5 (V 98, 12); Aët. XV, §. 45, 12.

145) Cf. note to A, 2-4, ad fin.

146) Paulus has 6 oz. Galen explains that the use of 6 oz. of copper, in place of 4 oz., will produce a medication more agglutinative for larger wounds and more cicatrizing for hard-to-cicatrize ulcers, but it is not suitable for treating inflammations (XIII 380, 10; also Aët. XV, p. 45, 16).

Inv. 21 F verso

7.5 x 11.5 cm.

Plate 6b

[...]

 [4-5] κιν. μυνεός δέ πλοσ-

 [περ.] Εύρας τόν φλοιόν

 4 [δέ καί] εἰς λ[ε]πτὰ κατα-

 [τεμνόμεν] ἐμβαλλε εἰς τήν

 [κακῶσ] ἴν [...]. [...]. [...]

 [4-5] [...] [...] [...]

 8 [...] [...] [...]

 τῷ μέρει λοιπῷ χρῶ

 [...] [...] [...]

 [...] [...] καὶ δια

 12 [...] [...] [...]

 [...] [...] [...]

 [...] [...] [...]

5 ἐμβαλλε

Translation

... Having first thoroughly scraped off the bark all around, cut it into fine pieces and cast them into the earthen pot ...

1ff. These lines contained the directions for introducing the juice of date-palm wood into the medication called the ποίνικιον, the recipe of which began on the recto side of the papyrus. See note to F, 10.

The pertinent parallels are found in Gal. XIII 378-379; Orib. Syn. III 5 (V 97-98); Aët. XV, pp. 44-45. The text of Aëtius has the following (p. 44, 18): ἀρκέει δέ τοι εἰς κλάδας τῶν μεγάλων εἰς τὸ τῷ μὲν ἀρωματίζῃ μέσει εἰς τὴν κίνεσιν ἀντὶ σπάθης κεισθῆναι, τοῦ δ' ἐτέρου τοῦ λεπτοτέρου καθάρας καὶ λεπτὰς τὸν φλοιόν καὶ εἰς λεπτά κατατεμὼν, ἐμβαλε τῷ σαρμάκῳ, ἵνα μεταδῷ τοῦ κατ' αὐτὸν χυλοῦ. ἐμβεβλήσθω δέ κατ' ἐκείνον τὸν καιρὸν τὰ τῆς ποίνικος τμήματα, καθ' ὃν τὸ φάρμακον ἔχει κηρωτὴν σύμμετρον σφύττειν. (ὅταν γὰρ ἀπ' ἀρχῆς βληθῇ, καταναλίσκεται διὰ τῆς ἐψήσεως ὁ χυλὸς αὐτοῦ, ὃν βουλούμεθα ἐπὶ πλεονεξίαν εἶναι διὰ τὴν ἐν αὐτῷ σιύσιν καὶ αὐτῆς δὲ τῆς σπάθης ἐφ' ἣ κινεῖται τὸ φάρμακον, τὸν κατὰ βραχὺ ἀναξηραίνοντα ἐν τῇ ἐψήσει κλάδον κατὰ βραχὺ ἀποτέμνων καὶ ἀπορρίπτων, τῷ καταλοιπῷ μέσει χρῶ. "To help you: one of the larger branches with a stouter part is to be used for the stirring in place of a spathe. And having cleaned and peeled off the bark of another thinner branch, cut it into fine pieces and add them to the medication, so that you distribute the juice through it. The cuttings of date-palm should be added at the time when the medication has a consistency commensurate with a cerate. For if they are added at the beginning, their juice will be consumed through

the boiling, and we wish the juice to remain longer with the astringency in it. And, cutting off little by little the branch of the spathe itself, with which the medication is being stirred, and which is being consumed in the boiling little by little, throw it away and use the part left remaining."

Galen has (378, 15): ἀποδέει δὲ τοὺς κλάδους εἰς τῶν μεγάλων, ὡς τῷ μὲν ἄδοψ μέρει τοῦ ξύλου χοῦσθαι κινεῖσθαι, κατὰ τὴν τῆς καλουμένης σπάθης χρεῖαν· οὕτως γὰρ ἐνομάζουσιν τὴν κινεῖσαν τὴν σκευάζουσαν, καὶ ἡμεῖς τοῦ παροῦς ἐχόμενοι καλῶμεν ἀσπίδα αὐτοῦ. τὸ δὲ συνεχὲς τῷ ἄδοψ μέρει τοῦ κλάδου περικαθῆρας καὶ τὰς ἐκατέρωθεν ἐκδορεῖς τὰς λεπτὰς ἀποτοίφας κατέτεμεν, προπεριξύρας τὸν φλοιὸν, ὅπως ἐμβληθέντι τὰ τεύχεα τῷ σκευάματι μεταδῶ τοῦ καθ' ἑαυτὸ χυλοῦ. "To help you: one of the larger branches, with a fat part of wood, is to be used for stirring, rather than using that called a 'spathe', for thus they name the instrument with which they stir medications being prepared, and we, to have clarity, call it the same. Having thoroughly cleaned the fat part of the branch all around, and having rubbed away the projections on every side and scraped off the bark all around, cut it into fine pieces, so that the cuttings thrown into the medication will have their juice distributed evenly through it." Galen continues much as Aëtius, ending with (379, 11-12) ἀποτίφει αὐτὸ καὶ ἀσπιδίαν τῇ λοιπῇ γὰρ.

2. (4-5) [κ.ν.] possibly (σπ.) κινῶ.

συνεχὲς δὲ κατὰ cf. Gal. 378-9, above, τὸ δὲ συνεχὲς ... περικαθῆρας.

3-4. εἰς] προπεριξύρας fits the traces of letters much better than κ[αὶ] . . . ἀποτίφει. Cf. Aët. p. 44, above, καὶ ἀποτίφει τὸν φλοιὸν.

4-5. εἰς] [ἐκ] τῶν κλάδων. Aëtius (id.) has εἰς λεπτὰ κατετεμ(ν)ῶν ἐμβάλλει τῷ σκευάματι. At this point Galen has (see above) τὰς λεπτὰς ... κατέτεμεν. At an earlier point in the directions (378, 14) he has καὶ πάντα κατὰ θυρεὸν ἐνὸς ἐμβάλλει ἐν τῇ κακῇ, κινῶν ξύλῳ φοινίκου, "and having united all together in a mortar, throw it into an earthen pot, stirring with a stick of date-palm." The version of Aëtius (p. 44, 17) has καὶ ἐκδορεῖς ἐμβάλλει εἰς τὴν κακῇ: καὶ ἔτι κινῶν σταθρὸν φοινίκου, "and having mixed thoroughly add to the earthen pot and boil, stirring with a spathe of date-palm."

6. (κακῇ] [κακῇ] a three-legged earthen pot. The word is spelled with one kappa, or two.

6-9. If the supplement in line 9 is correct the intervening text must have been much abbreviated, as compared with that of Aëtius and Galen. See Aët. p. 44, 22 ἐμβεβλήσθω καὶ. to 45, 6 τῇ καταλοιπῇ μέλει γὰρ, ¹⁴⁷ cited in the note to lines 1ff., above. We have reached the point of stirring the medication with a now shortened spathe of date-palm and are nearing the end of the instructions of Galen and Aëtius. After a suitable period of boiling, when the medication has become non-staining, it is taken from the fire and all of the cuttings (τὰ τεύχεα) which were added are removed. The mixture is to be

cooled while still stirring. It is then placed in a mortar (βουλία) and made pliable with the hands, being formed into cakes (καλλία) which are ready for use as plasters. The affections which are served by the phoinikē-plaster are numerous: bleeding wounds, hard-to-cicatrise and fistulous ulcers, all inflamed ulcers, gout, glandular tumours, fiery inflammations, chilblains, bruising, and all discharging conditions.

12. The three letters added above the line are in the second hand.

τῶ[ς] ἀπνοίᾳ, windpipe, or arteries, are not included by Galen or Aëtius among the uses of our plaster. Also possible but unlikely is τῶ ἀλκμήνῳ, medicinal, healing, an apparently uncommon word (cf. LSJ, s.v.).

13. [.] τῶ τμήμα (to would fit the traces.

147) Galen has τῶ λοιπῷ κρεῖ.

P.Mich. Inv. 21 G

5 x 7 cm.

Plate 7a

~~~~~  
 ἡ δὲ [ 8-10 πρὸς τὰ κα-]  
 κοή[θη  
 ου (δρ.) α [   
 4 οίνου [   
 ~~~~~  
 (Hd. 2) Εἴη (1 κροκώδες [
 κέλλης (δρ.) γ [
 χωρίστ[ι]
 8 κη (δρ.) ζ κα[
 ~~~~~

## 9. Pap. Eng.

1-4. These lines originally contained a complete recipe, as shown by the double-curved lines above 1 and below 4 in the first hand, that of the scribe.<sup>148</sup> They were the last lines of a page of the codex.

1. ἡ: sc. ἐπιλαστικός. There would not have been space for the word in the line if our supplement for the letters of line 2 is correct.

1-2. κακοήθη: malignant ulcers. Cf. 21 B for the Ἀζανίτης recipe πρὸς τὰ κακοήθη πάντα (Gal. XIII 785; Aët. XV, p. 123).

An illustrative recipe for lines 1-4, which meets the conditions of an ingredient ending in a vowel plus ου (line 3) and which contains οἶνος (line 4) is the following:

ἡ δὲ [χαλκίτις πρὸς τὰ κα-]  
 κοή[θη χαλκίτις (δρ.) α σιμυθί-]  
 ου (δρ.) α [ἀλός (δρ.) β λιθαργίου (δρ.) δ]  
 οἶνου [καὶ ἐλαίου τὸ δισκοῦν]

"The plaster with copper for malignant ulcers: 1 drachm of copper, 1 dr. of white lead, 2 dr. of salt, 4 dr. of litharge, a sufficient amount of wine and oil." It is taken from Gal. XIII 730, 14, where one of a succession of recipes quoted by Galen from the works of Archigenes on medications for various kinds of ulcers and similar affections, has the following: ἡ χαλκίτις, σιμυθίου ὄρν, ἀλός καινοῦ τὸ διπλοῦν, λιθαργίου τὸ διπλοῦν τοῦ ἀλός, οἶνω καὶ ἐλαίῳ ἐναλλάξ ἀραιῶν ὡς λιπαρῶ χροῦ.

<sup>148</sup> For similar double-curved lines to separate recipes, see P.Ant. III 134

For another recipe in our codex, ἡ ὀσμωκίνη, described by Galen as τὴν διὰ χαλκίτεως ἐπιπλαστρον, see F, 10, note. Cf. also C verso, 1-2, and H verso, 6, for plasters called διὰ [ῥο]δίνου and διὰ καλκιδίνου, "with rose oil" and "with zinc oxide."

5-8. These lines are in a second hand, presumably that of the physician-owner of the codex (cf. Introduction). He extruded his lines into the margin, which had been carefully preserved by the scribe, and wrote in a cursive hand, using smaller letters and frequent abbreviations so that he must have reached a total of ca. 45 letters per line. The four lines contained two recipes of two lines each as shown by the paragraphos beneath line 6.

5. ξηρ( ) κροκώδες: a dry or drying plaster or a powder with saffron. Possible is ξηρ(όν) or ξηρ(αντικόν), sc. κόρημακον. Also possible is ξηρ(ίον), a dessicative powder especially used for wounds and ulcers.<sup>149</sup> Among the treatments of Galen for eye affections is one called τὸ Πακκιδόν δι' ὀνυό κροκώδες, recommended for βουρραδὴν ἑλκῶν (filthy ulcers): ἐκεῖ δὲ τοῦτο πλεῖστον μὲν τὸν κρόκον, δι' οὗ καὶ κροκώδες ὀνομάζεται, "it has the greatest amount of saffron, for which reason it is named 'the saffron kollyrion'" (Gal. XII 715). Also of interest, although we do not expect to find remedies for eye diseases in our codex,<sup>150</sup> is the ξηροκαλλοπτικὸν τὸ διὰ κρόκου πρὸς ἀρχαίνας ὀφθαλμίας, "the drying salve with saffron for incipient ophthalmia" (Alex. Trakt. II 17). It calls for juice of the horned poppy, sarcocolla, saffron, and bitter aloes.

6. κόλλα: the word is not likely to refer to κόλλα, a flour-paste used for gluing books (Dsc. II 85.1; Gal. XII 33). Dioscorides, however, cites one medical use (p. 170.3): κόλλα δὲ ἡ γινομένη ἐκ τῆς τετιθέμενης καὶ γύρης πρὸς τὴν τῶν βιβλίων κόλλησιν δουρίζει ἐπὶ αἰμορροῖσιν, ὕστερα καὶ χλιαρὰ καταπορευομένη καλὰ πρὸς πλῆθος. "Flour-paste, that being made from the finest wheat flour and finest meal for the gluing of books, is suitable for those spitting blood, when it is diluted with additional water and is lukewarm, and a teaspoonful is swallowed by the patient."<sup>151</sup>

More likely is σαρκοκόλλα, ταυροκόλλα, or γουροκόλλα. σαρκοκόλλα is briefly described in Paul. VII 3: σαρκοκόλλα δάκνυν ἐστὶ δένδρου περὶ κοῦ ἐπιπλαστικόν τε καὶ ἀόρητως ξηραίνον καὶ διὰ τοῦτο καὶ τραύματα κολλᾷ.

<sup>149</sup> For references to these words on papyrus, see Marganne, p. 365; MPEK N.S. XIII 7, 1; and 12, passim.

<sup>150</sup> The order of medications usually followed by the ancient medical writers begins with the top of the head and works down. Hair problems, scalp troubles, eye diseases, and ear disorders are thus treated before remedies are given for wounds, ulcerations, abnormal swellings, etc. on the surface of the body.

<sup>151</sup> I did not find κόλλα τεκτονική, carpenter's glue, with the word-order reversed. See Gal. XII 829, 3 where it is mixed with several other ingredients and made into troches, which are diluted with vinegar for use in removing callosities from abscesses or fistulous sores. For removing lichens with κόλλα τεκτονική cf. 832, 5.

"Sarcocolla is the gum of a Persian tree which is emplastic and dessicative without pungency, and therefore it agglutinates wounds." Cf. also Dsc. III 85; Gal. XII 118.

ταυροκόλλα, gum made from bulls' hides, is used especially for removing lichens, a skin disease characterized by wide, flat eruptions of the skin. For plasters for Lichens in our codex, see C. 10 and L. 6. For recipes including taurocolla among their ingredients, cf. Dsc. Eup. I 121 (p. 197, 27); Gal. XII 832-3; 835,2; 837,9; Aët. VIII 16 (p. 423,11; 424,25). None of the recipes call also for saffron.

χρυσόκολλα, malachite, or copper carbonate, is described in Dsc. V 89; Gal. XI 242; Paul. VII 3. According to Dioscorides: χρυσόκολλα τανκτικὴν οὖσαν καταταλτικὴν σαρκοῦσιν. "Chrysocolla has the property of rubbing off scurs and checking fleshy excrescences." Among the cicatrizing ἐλκὸς of Andromachus (Gal. XIII 728) is the following (729,10): ἄλλο ἐλκὸς πρὸς τὰ ὑπερσσεκρῶντα ἐλκὸς οὖν δόνητον, ὡς Ἀρσενικοῦ, σαρκοῦσιν, χρυσόκολλα, ἀποξηροῦ ἐκόν ἐκόντου, καὶ πρὸς κακοήθην ποιεῖ τοῦτο το σάββατον. "Another non-pungent powder for cicatrizing excessive fleshy excrescences, that according to Harpocras: red sulphide of arsenic, malachite, and yellow orpiment - equal amounts of each. This medication is also good for malignant ulcers." For other recipes which include malachite among their ingredients, see Gal. XIII 489,14; 688,12; 695,2; Aët. VIII 16 (p. 425,24). All of these are plasters for ulcers but none of them call for saffron.

7-8. These lines contained a second recipe which may not have been complete. Lines 5-8 take up only 2 cm. in depth, whereas the second hand often wrote 7-8 lines in the lower margins and required only 3-3.2 cm. (cf. 21 H and M and Introduction).

7. χρυσόκολλα: perhaps χρυσόκολλα (cicatrizing) = χρυσόκολλα, or less likely χρυσόκολλα; cf. 5, 9 and note ad loc. This interpretation would infer that χρυσόκολλα had been an ingredient of the preceding recipe (lines 5-6), but the present similar recipe omitted it.

If the diaeresis was inadvertent the text may have had χρυσόκολλα or χρυσόκολλα, "without iron," or "without ironwork" (cf. LSJ s.v. χρυσόκολλα, II and Dsc. 4.33-34). The herb is especially recommended for agglutinating wounds.

Inv. 21 Q verso

5 x 7 cm,  
Plate 7b

-----  
[p  
[κα  
[κα  
4 [την  
[δόνητον  
[ουκ

(Hd.2) ]...[...]ου μο( ) θ.

8 ] (δρ.) ιθ

]...]η=

- - - - -

# 7. Pap. 57

1-6. These are the ends of the last six lines of a page from the body of the codex.

7-9. These are the ends of three lines added in the lower margin by the second hand. They are much damaged by fraying of the papyrus.

7. μο( ) θ.: If the reading is correct it must be for μο(τύλαι) θ, plus a fraction, which looks on the papyrus like a reversed three-obol sign, 7. The preceding ingredient was then a liquid.

P.Mich. Inv. 21 H

9 x 8 cm.

Plate 8a

- - - - -

...]

ἐνώσα[ ] οὐκ[ ]

(αὐτῶν [...].δοτε[

4

(ἡ ἐπιπλαστὸς δὲ δ[ ]νῃ 13 ]

καθάρσ- τὰ πένταλ[α δὲ δ[ ]

του κλάδου τὰ δ[ ]

(Hd.2) [ἐπιπλαστὸς ἀποδέν[ο]μενῶν σαρρ[ουένῶν 15]

8

σοι τῶ τῶν [...]

δεδόκτα) κηροῦ (οὐγ.) α .[

ρ + μίτρως κ-β( ) (δρ.) α α.[

χαλβάνη(η) (οὐγ.) θ μ[

12

χαλβάνην καὶ ]

[...αρεστω] οὐκ[

δληθῆσας χρῶ ]

9. δέδωκα, Pap. δεδωγ 10. Pap. εδβ 11. Pap. χαλβαν

1-6. These lines were the last lines of a page of the codex.

2. ἐνώσα[ ] οὐκ[ ], "having united in a mortar." For the verb in our codex, see C, 4. Also possible is οὐκ[ ] ἐνώσα[ ] and εὐεργ[ ] "having mixed well together." For the compound verb, see A verso, 3; C, 5; E verso, 12.

3. [...].δοτε[ ]: δότε or ἀνάδοτε is not likely since the recipe must have been for a plaster or salve, not a liquid, as shown by line 4 which has the title of a new plaster.

4. ἡ ἐπιπλαστὸς δὲ δ[ ]νῃ: The scribe did not indent this line or leave a space before it, but he did separate the new recipe from the preceding with a paragraphos connected to two marks of parenthesis in the margin. For another

plaster with rose oil in our codex, see C verso, 2.

5-6. καὶ ὅπου ... κλάδου: "having washed the leaves of a branch of hyssop." Gal. XII 826 has four medications in succession for hardened skin eruptions on the face, πρὸς τετραμυέλουρ ἰόνθου. The second calls for equal parts of red sodium carbonate, hyssop, pennyroyal and quarried salts, pounded, put through a fine sieve, and added to a cerate with rose oil. The fourth recipe calls for equal parts of baked salts, pennyroyal, hyssop, ammoniac incense and tanning sumach, which are taken into a cerate with rose oil and thereafter applied to the skin eruptions.

In place of καὶ ὅπου the text may have had ἀνα] καὶ ὅπου or δια] καὶ ὅπου since line 4 has only 17 letters.

6. τοῦ δ[. δένδρου: would not normally be used of ὄσωνος.

7-14. These lines are in the second hand and probably contain at least two recipes in view of the two symbols in the margin opposite lines 8-9 and line 10. The same two signs are in the margin opposite lines 7-9 of M, again by the second hand with reference to his own recipes added at the foot of the page.

7. The second hand extruded this line 1 cm. into the margin, beneath a wavy line he had drawn to separate his text from that above.



[f]υνάκτιον. It appears to have been corrected from a premature λ. συνέκτιον, according to Galen (XIII 372), was an earlier form of συνέκτιον.


ἀποδομολύει συμπληρώει: The supplement is illustrative. The plaster or salve may be for a person suffering from impacted bowels (ἀποδομολύει, to discharge feces; συμπληρώει, to press close, compress).

8. εἰ: the physician-owner is giving his own experience with the recipe in lines 7-9, and has drawn special attention to it with a sign in the margin, εἰ, which he repeats twice in the margin of M, 5-6 and 7-8. The text may have had εἰ ποτ[; cf. Gal. XIII 375, 10 and note to line 9, below.

καὶ πόνο: "for the pain." After πόνο there is not enough ink to hazard any letters.

9. δέδωκα(α) : δέδωκα: "I have given" for the preceding ailment the following recipe: "one ounce of wax. ..." Cf. Galen's introduction to his περὶ κίβητος recipe with copper, quoted in the note to 2<sup>o</sup> F, 10.

10. This line is the beginning of a second recipe and has in the margin the familiar symbol for ἀποδομολύει, "good, useful, effective." Here it has the form ; it is more often found . For the symbol see K. McNamee, Abbreviations in Greek Literary Papyri and Ostraca, BASP Suppl. 3, p. 109.

Following the symbol, the first letter in line 10 appears to be another symbol, , perhaps indicating the start of a new recipe. Cf. the sign used in the Kuhn text of Galen to introduce the ingredients of each new recipe, e.g. XII 826, the page mentioned in the note to lines 5-6, above, which has



four consecutive recipes for facial skin eruptions, lines 6, 10, 12 and 16. The symbol is made  $\lambda$ . Perhaps our sign and that used by Kühn are both stylized representations of lambda with an abbreviation-mark =  $\lambda(\acute{\alpha}\mu\beta\alpha\upsilon\epsilon)$  or  $\lambda(\acute{\alpha}\beta\epsilon)$  = Lat. Recipe), "take".

$\mu\acute{\iota}\sigma\upsilon\sigma$   $\epsilon\sigma\beta(\lambda)$  (6p.)  $\alpha$ : Any reading of the letters after mu is difficult. If  $\epsilon\sigma$  is correct it was made as a monogram. After  $\mu\acute{\iota}\sigma\upsilon\sigma$  one would expect  $\acute{\omega}\mu\alpha\upsilon$  or  $\acute{\alpha}\pi\tau\alpha\upsilon$ , "crude or baked copper", or possibly a place-name such as  $\kappa\upsilon\mu\acute{\alpha}\rho\iota\sigma\upsilon$  (cf. D. 5 and footnote 83).  $\epsilon\sigma\beta(\lambda)$  brings to mind  $\epsilon\beta\acute{\alpha}\nu\upsilon\sigma\iota$ , to quench; the word is found with respect to the metal litharge in Dsc. 5.87.3, where the method of burning is given,  $\acute{\epsilon}\nu\iota\alpha\iota\ \delta\acute{\epsilon}\ \delta\acute{\epsilon}\epsilon\iota\ \acute{\alpha}\ \rho\acute{\omega}\mu\alpha\ \epsilon\beta\acute{\alpha}\nu\upsilon\sigma\iota\tau\epsilon\ \alpha\upsilon\tau\acute{\eta}\nu\ \tau\acute{\rho}\iota\varsigma\ \pi\acute{\alpha}\lambda\iota\upsilon\ \kappa\alpha\tau\acute{\omega}\nu\alpha\iota$ , "some, quenching it with vinegar or wine, burn it again, three times." If the three letters in our text are resolved as the verb  $\epsilon\sigma\beta\acute{\alpha}\nu\upsilon\sigma\iota$ , "I quenched the one drachm of copper," we would need to supply many more missing words than usual.

11.  $\chi\alpha\lambda\beta\acute{\alpha}\nu(\eta\epsilon)$ , the resinous juice of all-heal: The writer made a start on the first vertical of eta, but abandoned it in favor of an abbreviating-oblique stroke below nu.

$\mu\upsilon\lambda\acute{\iota}$ : The most common recipe-ingredients which begin with the letters mu are perhaps  $\mu\upsilon\sigma\acute{\iota}\kappa\eta$ , tamarisk (Dsc. I 87, Gal. XII 80) and  $\mu\upsilon\sigma\kappa\acute{\iota}\nu\eta$ , myrtle (Dsc. I 112, Gal. XII 81). For the latter see B verso, 11, ( $\mu\upsilon\sigma\kappa\acute{\iota}\nu\eta\ \gamma\iota\upsilon\lambda\iota\sigma\iota\upsilon$ ).

13. The cancellation was effected with nine dots above the letters and two horizontal lines through them.

$\theta\upsilon$ : possibly  $\theta\upsilon\lambda\acute{\iota}\rho$ , "in a mortar".

14.  $\delta\iota\eta\theta\acute{\eta}\tau\alpha\iota\ \chi\epsilon\acute{\omega}$  (, "strain and use". The recipe may have ended at that point.

P.Mich. Inv. 21 H verso

9 x 8 cm.

Plate 8b

[καὶ τ(ε)δς τοῦς  
[κόλπουσ προεψά]του(ι) καὶ τῶ(ιν)  
[ἐλκῶν συνουλο]υμένων καὶ ξ(ηρῶν)  
4 [ποδς τὰ δυσ]επούλωτα ἐλκῇ πληροῖ  
[καὶ ποδς δ]έ τὰς χιμέτλας κτ  
(Hd. 2) [ἐμπλαστρὸς ἢ διὰ πάλμωδλυγος πομφόλυγος (οὔγ.) β  
[λιθασγύρου (οὔγ.) γ στέατος ὀρ]γνιθεῖ(ου) (οὔγ.) β κηροῦ (οὔγ.) δ  
8 [χυλοῦ λινωσπέσμου (οὔγ.) χαμαιμῆλου] (οὔγ.) ε τὰ τηκτὰ  
[κατὰ τῶν λείων τῆς λιθασγύρου καὶ τοῦ πομφόλυγος

2. Pap. τῶ

3. marg. Pap. ξι

4. marg. Pap. πληρ

5. χιμέτλας

ι corr. ex. 3, καὶ

## Translation

... It is good for new fistulous ulcers, for ulcers needing to be completely cicatrized, and for those that are hard to cicatrize; it is also good for chilblains and ...

(Hd.2) The plaster with zinc oxide: 2 ounces of zinc oxide, 3 oz. of litharge, 2 oz. of poultry-fat, 4 oz. of wax, juice of linseed, 5 oz. of chamomile. Add the melted solubles to the triturated litharge and zinc oxide.

1-5. The last five lines of this page of the codex had the uses of a foregoing recipe, which were continued at the top of the following page. They are reminiscent of those given for the *ποινικίνη*-plaster of Galen (XIII 389; Aët. XV, p. 45; F. 10ff.).

2. (*κόλπουσ ποινικίνου*): recent fistulous ulcers. The supplement is illustrative. For these ulcers which spread under the skin, see A verso, 12, n.; B, 6; B verso, 4. For the *ποινικίνη* recipe as a remedy for *κόλποι*, *δυσκοῦλιστα ἔλκη* and *χίμειλα*, among other affections, see Aët. XV, p. 45. A *μηλικίνη*-recipe of Heras is good *πρὸς τοὺς παλαιὸς κόλπουσ* (Gal. XIII 511, 6). The *lais plaster* of Epigones forms callouses on *κόλπουσ* and *εὐρυγὰρ πύλασ ποινικίνου*, "all recent abscesses."

After *καὶ* sc. *ἐπὶ*.

3. (*ἐλκῶν συνουλοῦμένων*): Possible also is (*ἐλκῶν ἐπουλοῦμένων*). For the verbs in connection with ulcers, see the notes to B verso, 7 and F. 10. Gal. XIII 412, 17 has *συνουλοῦμένων ἐλκῶν*, but on 522, 1-3, the verbal adjectival forms are regarded as interchangeable: *εἴτ' ἐπουλωτικῶς εἴτε συνουλωτικῶς ἐθέλει; ἐνουλάζειν τὰς οὐλὴν ποιοῦσας ἐπιλάττειν*.

3-4, marg. To the right of these lines are two additions in the second hand. Opposite line 3 is a single letter followed by a vertical stroke, *Ε* = *Εἰς* (πόιν) or *Εἰς* (πόιν), for which see the note to G. 5. Recipes for plasters could be made into powders or dry applications by the omission of liquids.

Opposite line 4 is *πληρὶ* = *πληροῖ*. See the note to D, 3-4, on the filling of ulcers.

4. *τὰ δυσκοῦλιστα ἔλκη*, hard-to-cicatrize ulcers. See B verso, 2 with note to lines 1-4.

5. *τὰ χίμειλα*, chilblains. See F, 8-9, note.

*καὶ* = *καὶ*: See note to F. 7.

6-9. The second hand added in the lower margin the recipe for the plaster *ἡ δὲ ποινικίνη*, "with zinc oxide". Beneath the four lines of the text is a blank space of one line, followed by three more lines of text, so badly rubbed by some abrasive material that only tiny dots of ink remain here and there. These lines could in fact have been deliberately erased.

The plaster with pompholyx is found in several of the ancient medical writers. The recipes vary in the number of minerals called for - from two to five - and in the number and content of the remaining ingredients. All have litharge, in addition to pompholyx, and all have wax. The total number

of ingredients varies from 5 in Paulus' τὸ πομφόλυγον (VII 17.31) to 14 in the plaster of Aëtius, ἡ διὰ πομφόλυγον καὶ καππάδοκον (XV, p. 136). Three other plasters have 8 ingredients each: Aët. XV, p. 131, 1, φάρμακον τὸ διὰ πομφόλυγον; p. 131, 10, ἄλλα ὡς Ἀσκιγένοισι καὶ Ὀρεβάσιος; Orib. Eupor. IV 130 (V 788), τὸ διὰ πομφόλυγον. The two recipes of Oribasius have the same ingredients but varying amounts, and one difference in the ingredient ὠόν, eggs. The recipe given by Aëtius calls for nine baked egg yolks, while that in Orib. Eupor. calls for "eggs without yolks" (the number unspecified, or accidentally omitted).

The text given above of H verso, 6-9, is modeled on that of Paulus and is for illustrative purposes only.

6. πομφόλυγον (οὖν.) β: so Paul. also.

7. στεάρον ὀρνιθίων (οὖν.) β: Paul. has στεάτων χηνῶν ἢ δοριδεῶν (οὖν.) β, with two MSS having sing. forms.

κηροῦ (οὖν.) δ: Paul. has κ. (οὖν.) ζ.

8. χαμαιωήλου (οὖν.) κ: Paul. has χ. (οὖν.) ζ.

8-9. τὰ τεκτὰ κτλ.: The text of Paulus is the following: πομφόλυγον (οὖν.) β, λιθαργίου (οὖν.) γ· λειοῦνται μετὰ χυλοῦ λινοσπίτου καὶ ἐπιβάλλεται τακέντα καὶ συγέιντα κηροῦ (οὖν.) ζ, στεάτων χηνῶν ἢ δοριδεῶν (οὖν.) β, χαμαιωήλου (οὖν.) ζ. "The 2 oz. of pompholyx and 1 oz. of litharge are finely pounded with the juice of linseed; when melted and cooled (the remaining ingredients) are added, 6 oz. of wax, 2 oz. of goose or poultry fat, 6 oz. of chamomile." The directions of Aëtius for the recipe on p. 131, 1 are κῶμα καὶ σπῆρα τὰ μεταλλικά, λείου οὖν ὀνυ καὶ ἐπίχευ αὐτοῖς τὰ τεκτὰ καὶ χροῦ. "Pound and put through a sieve the minerals and triturate them with wine. Pour the melted solubles over them, and use." Cf. the brief direction τὰ τεκτὰ κατὰ τὸν ἔπαλιν in A, 11 and B verso, 12. Several words may have been lost at the end of our text in the first half of the "blank space of one line". See the note to lines 6-9, above.

On the uses of the plaster with pompholyx, Aëtius has (p. 136) μάλα τα δὲ ποιεῖ ἐπὶ τῶν κακοήθων ἔλκων καὶ καρκινωδῶν διαβήσεων, καὶ τὰ παλαιὰ ἔλκη καὶ δυσπρόσωτα καὶ τὰ ποικίλα. "It is especially effective for malignant ulcers and cancerous conditions, for chronic and hard-to-cicatrise ulcers, and those caused by burns." Cf. Paul. IV 4.2 εἰ δὲ ἔλκωθεῖν τὸ μέν, χοῦσθαι παρύγρον καὶ τὴν διὰ πομφόλυγον καλομένην, "if the parts are ulcerated, use the parygion or the plaster called that with pompholyx." Cf. note to A, 5ff.

P.Mich. Inv. 21 f

5 x 6 cm.

Plate 9a

17c  
κροῦ κηροῦ  
ἡ δὲ

(Hs.2) 4 ] Ἀναιμωτὶς  
 ] κολο σποχί ]  
 ] κολο καί  
 ]  
 8 ] κολο  
 ] κολο  
 ] κολο

## 2. κατάρροον

iff. This page of the codex, I recto, did not contain recipes for plasters as did all of the preceding texts. Together with I verso, J recto, J verso, and L verso, it contains recipes for κατάρροια (pills) or τροχίσκοι (troches) to be taken with liquids as anodynes or antidotes for various physiological ills. 21 I and J were surely consecutive, though not necessarily in that order, since a small piece of the tying-cord is still caught in a bottom hole of 21 I, having become detached from the much longer piece still in place in 21 J. 21 L verso also belongs to these texts as it contains similar recipes, but it was the turning point in the codex for the beginning of recipes for plasters, since plasters are found in both the main text of 21 I recto and by the second hand in the lower margin. The most likely original order, therefore, of the fragments of Inv. 21 is the following: I, J, L verso, L recto, G, H, K, M, followed by A-F. See the order of recipes, with respect to plasters and pills, in Galen's books on the Composition of Drugs. The latter are found for the most part in XIII 1-361, with recipes for plasters following.

2. κατάρροον - κατάρροια, κατάρροον, catarrh, the inflammation of any mucous membrane, especially of the air passages of the head and throat (LSJ). Galen has a recipe called the anodyne of Antonius Mousas (XIII 57, 3) ἐπὶ κατάρροον τροχίσκου καὶ ποτὶ τὴν ἰσθμὸν ἀναιμωτὶς, "which is effective for catarrh and loss of voice." The ingredients are opium, myrrh and seed of henbane; the final direction is ἀναλαβὴν κατάρροια δοῦναι τὸ μέγεθος καὶ διδοῦναι εἰς δύο καὶ ἀποκοπτεῖν. "Form into small pills the size of vetch-seed and give two on retiring at bedtime."

3. ἡ δόσις, a dose of medicine. Also possible is ἡ ἰσθμὸν δόσις, an adult dose; cf. J, 6. The sentence was continued at the top of the next page. An anodyne of Proxenus from the works of Antonius Mousas (XIII 61, 11) is good for chronic coughs and recurrent discharging conditions, and also for allaying fevers. After the ingredients is the direction: ἡ δόσις καρβου Ποντικῆ τοῦ μεγέθους μετ' ὀσμωμένῳ καὶ (ἄδαν) γ. "The dose is a pill the size of a Pontic nut with three kyathoi of hydromel." For 3 kyathoi = ca. one-half cup, see LSJ, s.v. κύαθος. Another anodyne (59, 10) which is "good for coughing and is an altogether excellent expectorant", concludes with ἀναλαβὴν μελίτι, ἀπὸ θυ, ἡ δόσις καὶ λ. π. καλὸν, "take with boiled honey, the dose is one good spoonful. The measure καλιδάριον is found in our codex in I verso, 3.

4-10. See note to lines 1ff., above. In view of the 40-45 letters per line, postulated for the second hand (see Introduction), there must have been a number of different conditions specified in lines 4-6, for which this recipe was useful.

4. ἡπαρικοῖς: for those suffering from liver complaints. A medication of Andromachus from a recipe of Eugenius (XIII 114, 13) has the following: πρὸς δοδονοῖκοις, βηχικοῖς, πνευματικοῖς, φθισικοῖς, ἀσπληνικοῖς, ἡπαρικοῖς, "for those suffering from orthopnoea, coughing, inflammation of the lungs, consumption, shortness of breath, and liver complaints." The direction for use is δίδου κοχλιάριον ἐν αἵθ' ὕδατος κυάδων δύο ἢ τριῶν, "give one spoonful with two or three kyathoi of water." An antidote for an upset stomach (158, 14) is also good for τοῖς καυρούμενοι καὶ πρὸς πᾶσαν ἐμπνευματικὴν καὶ σπασμωδικήν, ... ὁδονοῖκοις, πνευματικοῖς, ἡπαρικοῖς, "for those suffering from heartburn, every type of flatulence, slow digestion, dropsy, kidney and liver complaints." A recipe for a diuretic (213, 6) begins πρὸς πρὸς τὰς ἐκπρόσεις τοῦ ἡπατος διαθέσεις καὶ σπληνικοῖς καὶ τοῖς δυσανὰ λήτοις καὶ ὁδονοῖκοις καὶ καθόλου ἐνδοταῖς ἐμπόει. "It is good for calloused conditions of the liver, for those suffering from splenetic affections, from a difficult convalescence back to normal habits, and from dropsy; and, in general, it produces a healthy complexion."

5. ομοῖ (1, perhaps ομοῖ (m)) διαθέσεις, "similar conditions."

P.Mich. Inv. 21 : verso

5 x 6 cm.

Plate 9b

6[  
κατα[  
τιθε[  
[  
(Md. 2) 4 πυρέθρου  
κακοῖς .[  
[  
ἀλκα[  
σελη[  
8 ...]

1-3. These are the last three lines of a page of the codex. For the probable content see note to 21 : 1, 1ff.

4-5. These lines, in the second hand, held a complete recipe as shown by the paragraphos beneath line 5. And the ingredients must have been few, not more than three or four, since they were limited to line 4.

4. πυρέθρου, pellitory: On this herb see Esc. III 73; Gal. XII 110. An anodyne with only three ingredients is found in Gal. XIII 56. It has the following: ἄλλη πρὸς κατάσσεις καὶ τὰς τὰς βηχίκοις διαθέσεις. Ἀσκληπιάδης ἐν τῇ πρώτῃ τῶν ἐντέων οὕτως ἔγραψεν πρὸς κατάσσεις, ἢ ἐχοήτατο κόμων ὁ φιλόσοφος ὡς ἐλεῖ παραχοῆμα, πυρέθρου, κόστην ἀνὰ (δρ.) β. πεπρόσως λευκοῦ (δρ.) α.

καὶ τῆς ἀποδοῦ. ἐν δὲ τῇ χοῆρτι κέλευε παραπτεῖσθαι τῶν μυετιῶν καὶ τὸ ὑάριον ἀναστῆναι. "Another anodyne for catarrhs and all conditions accompanied by coughing. Asclepiades in the first book of his work on internal disorders wrote about catarrhs that Komon, the philosopher, had used this recipe and was helped immediately. 2 drachms each of pellitory and costus, and 1 drachm of white pepper. Pound them fine, put through a sieve, and store. For use, urge that the medication be applied to the nostrils and inhaled."

An antidote for poisonous bites, made of most common and powerful ingredients (Alex. Trall. I 357, 8), has the following: ἡ τοῦ πυρέθρου ρίζα κοπτομένη καὶ ἀναλαμπανούνη μελίτι, καλλιόλον ἐν, ἐκ διαστήματος ἀχρὶς ἐνδοκα δοσῶν, πεπρίσται τὸ βούτυρον, καὶ μὴ τῇ ἐπιτελείᾳ αὐτοῦ κατασπονδῆται. "The root of pellitory, pounded fine and taken into honey. One spoonful, at intervals, up to eleven doses. This remedy is proved, and you should not despise it because of its cheapness." Cf. 21 A, 7-8.

5. κακοῦς .[: perhaps ποός] . κακοῦς κ[ατάσπους. Cf. the preceding note and I recto, 2, note.

6-8. These lines held another recipe by the second hand.

6. ἀλκαία[: For ἀλκαία, vervain mallow, *Malva moschata*, see Dsc. III 147, where the brief description concludes with ρίζα λευκὰ πλάγια (πλατεία app. var.) πέντε ἢ ἕξ ὁσόν περὶ, αἵνας ἐν οἶνῳ ἢ ὕδατι πινόμεναι δυσεντερίαν καὶ ἀήματα ἰάσται, "five or six broad white roots, as much as a cubit long, which, being drunk with wine or water, will cure dysentery and ruptures." ἀλκαία is not found among the "simples" of Galen or Aëtius, but Paulus (VII 3) has ἀλκαία (ἀλκαία) εἶδος ἐστὶ καὶ αὐτὴ τῆς ἀχρὶς μαλάχης, τὸν οἶνῳ πινούμην δυσεντερίαν καὶ ἀήματα ἰάσται, καὶ ἄλλον ἢ ρίζα αὐτῆς. "Alcaea is a kind of wild mallow. Being drunk with wine, it cures dysenteries and internal gnawings, more particularly its root." One manuscript of Paulus, K, has ὀλθαία (in place of ἀλκαία) which is another kind of wild mallow, called marsh mallow. It is found among the "simples" of all the medical writers and is frequently listed among the ingredients for recipes of various kinds. Cf. especially Dsc. III 146 where its many uses are cited, including those which are given for ἀλκαία. It thus appears likely that because of its many more uses ὀλθαία was preferred to ἀλκαία by the medical practitioners.

ἀλκαί, remedy, is a possible but less likely reading of line 6. Cf. the single reference from Aretaeus in LSJ, s.v.

P.Mich. Inv. 21 7

7 x 6.5 cm.

Plate 10a

-----  
|  
|τοι  
|ανου



(H3.2) 4 ] ἐννευμα-  
 ] πηρίαν ἐν  
 ] τοῦ.) γ ἡ τελε(ία)  
 ] τὰ ποτῆμα(τα)  
 6 ] εἶον(να)  
 ] κα-  
 ]

A 9-10 cm. length of the tying-cord is still in place, caught in three sets of two holes each opposite lines 4-9. See plate and Introduction to Inv. 21, with footnote 2.

1-3. These are the last three lines of a page of the codex. For the probable content see note to 21 1, 1ff. In the margin, about 1 cm. to the right of lines 2-3 and midway between them, is a small colon in the second hand. A colon is sometimes used to mark the end of a section, often in the middle of a line. Cf. E.C. Turner, *Greek Manuscripts of the Ancient World*, 10. But the colon in our text is so small it could have been inadvertent.

4ff. These lines were written by the second hand with a blank space of 1 cm. left above line 4.

4-5. ἐννευμα[ ... ] πηρίαν. Possibly ποδ[ ... ] ἐννευμα[ ... ] καὶ βραδύ] πηρίαν. Cf. Gal. XIII 158, 14, for the sacred antidote of Themison ποδ: πᾶσαν ἐννευματικὴν καὶ βραδύνην, κτλ., "for every kind of flatulence and slow digestion, etc." For δουρηρίαν, cf. 165, 2: ἀεὶ τοῦ ἀνέκτιστος φάρμακον ἐκτετακμένον ἀνόδονον, ἐννευματικόν, καὶ γὰρ τὰ κατὰ τὸν στομάχον ἰσθμὶ νοσήματα θαυμαστῶς, ὀδυνητικὰ καὶ δουρητικὰ ἀνιλάσκει τοσοῦτον, λυγρὸν, ἐννευματικόν. "A stellar unbeatable medication, a successful all-purpose anodyne, which produces sleep. For it heals wonderfully the ills of the stomach, and stops heartburn, indigestion, colic, retchings, and flatulence." Less likely in our text is ἀνέκτιστος, "indigestion", but cf. Gal. VII 66 for problems of digestion, including ἄντα-, δουρητ-, βραδύνητα.

5. ἐν: possibly ἐν τρέχει or ἐν τρέχει. Cf. Gal. II 85.2 ποδ ἐννευματικὴν ἐντρέχει. Also possible is ἐν (τόν) cf. Gal. XIII 294, 17 κότμα ποδ τὰ ἐντὸς δεύματα. Less likely is ἐν (-τοῦτα).

6. The ingredients were few since they were limited to ca. 30-35 letters in line 6. The amount of the last ingredient was 3 ounces.

ἡ τελε(ία): sc. δόσις, unless it was the first word of line 7. Cf. 21 1, 3, note.

7. τὰ ποτῆμα(τα): If the reading is correct, the "pills" (cf. LSJ, s.v.) would refer to the preceding recipe and the text would continue with further uses, ending with εἶον(να), "they also give a sound sleep" (line 8). For κότμα, cf. note to line 5, above, and Gal. XIII 295, 5, κότμα ποδ πᾶν δεύμα καὶ ἐννευματικὸν λυγρὸν τοσοῦτον, "a pill of Lucius of Tarsus for every

kind of discharge and flatulence." The direction is ὁδοι. ἀναλίσσεται καὶ οὕτω χρῆσθαι, "take with water and use in the same way." For πότνια in the papyri: see P.Oxy. VIII 1088, 48 π. ποτὶς ἡ(α)ττικ(ο)ύς, "for liver-patients"; 63 π. ὑδρωτικῶν, "for dropsy-patients"; 66 ὕπνωτικὸν πότνια, "a sleeping draught".

An alternative reading τὰ καλὶτὰ καὶ, "the little pills", might be interpreted similarly, rather than a start on a new recipe which would be expected to end at the bottom of the page. For these small pills, see, e.g. Gal. XIII 57, 7; 67, 5; 68, 4. 16; 69, 12; et al.

8. εἶσθαι(να): "giving good sleep". Cf. LSJ, s.v. An anodyne of Galen is described as follows (59, 17): κατανότιον βηχικὸν ποτὶς τὰς προφάρους δ.α-θέραις πανάκεια φάρμακον ἀνῶδον καὶ ὑπνωτικόν, ποιεῖ αἰμορρῆκοις, "a pill for coughs, a panacea for recent conditions, an anodyne medication which is sleep-producing and is effective for those suffering from spitting of blood." For another sleep-producing remedy, see 158, 14, in note to lines 4-5, above.

10. There is a space of 1 cm. below line 9, which is ample for another few words to complete the recipe.

Inv. 21 J verso

7 x 6.5 cm.

Plate 10b

(Hd.2) 4 εὐκκο[πτικοῖς  
τοῦ κα[  
τοῦ δ[  
αδω[.  
8 θε[

4. εὐκκοπτικοῖς

1-3. These are the last three lines of a page of the codex. For the probable content see note to 21 I, 1ff.

3. For several ailments ending in -τικοῖς (-τικοῦς) see notes to 21 I, 4 and line 4, below.

4-8. These lines are in the second hand, which here preserved the same margin as that of the text above. No paragraphos is visible between the two texts, nor was there a space left between them. The five lines occupy only 2.5 cm. of the normal 4 cm. of the lower margin, and since they seem to be filled almost entirely with ailments, at least two or three more lines are needed to complete the recipe.

4. εὐκκο[πτικοῖς, "for those afflicted with syncope", a sudden loss of strength. Also possible is εὐκκο[προυνότις, with the same meaning. For the

adjective see Gal. XV 462, 9 and P. Ant. III 124 (b) 11, 15. In the latter instance it is joined (lines 12ff.) with παροντικοῖς, νεφρικοῖς, λεθαργικοῖς, πυρρικοῖς, καυσώδεσιν and διαφρορητικοῖς, "those suffering from pleurisy, kidney complaints, lethargic fever, burning fevers and exhausting perspiration." For the verb see Gal. VIII 866; IX 291.

5,6. From dative forms the construction changed, as often, to πρός + accusatives. Cf. e.g. Gal. XIII 35,2 πρὸς κατόρους, βήττους, κτλ.; 60, 14ff.; 65-66; 158, 14ff.; and note to J, 7.

P. Mich. Inv. 31 K

6,5 x 7 cm.

Plate 11a

-----  
 λω[  
 λαρ[  
 4 τοῦ ο[  
 νια[ (δο.) η χα[  
 [...]  
 (Hd. 2) κράτος καὶ κ.[  
 λῖξαι τοῖς τοῦ [...]  
 8 δικταῖς μετὰ [...]  
 τῷ πρῶτῳ [...]  
 μετὰ χυλοῦ γυν[...]

7. τοῖς 8. -δῆκτοις

1-5. These lines have the remnants of the last five lines of a page of the codex. They are so meager that we cannot be sure of a single word.

1. λω[ is reminiscent of the verb λείω, to pound fine or triturate, which occurs so frequently in the directions for making plasters and other medications. Cf., e.g., Aët. XV, p. 120, 20 πολυβόλαιον καὶ λεπιδὰ κόψας καὶ χέρας, τοῖς δὲ ἄλλας λείψας ἀκριβέστατα, ἐπειτα ἅμα λείψας πάλιν καὶ χροῶδη ποιεῖρας, ἐπιβάλλε αὐτοῖς τὸ ἐλαιον καὶ λείψαι θοῦς εἰς σάλα. "Pound and sift the lead and the copper flakes and thoroughly pound fine the salts. Then pound again altogether, and make into a fine powder. Add to these the oil and triturate in a mortar to a very soft consistency." But in our text we would have a partial direction before all of the ingredients are given. See line 4. -νια[ (δο.) η.

2. λαρ[ is reminiscent of λάριξ, the larch tree, frequently found with δαρτίνη, and often used in place of τερενθίνην δαρτίνη. Cf. Gal. XIII 451, where Tyrrhenian and Pontic wax are called the very best for use in λευκαὶ ἐμπλαστῶν, and the resins ἡ λάριξ ὀνομαζομένη καὶ ἡ τερενθίνη are cited as the most useful for malignant ulcers. A recipe of Asklepiades for δυσθεραπεύτων ἐλκῶν, ulcers which are difficult to heal, has the following (743, 16): λεπιδὰ χαλκοῦ, τοῦ ξυστοῦ ἀνὰ τοῦ γ. α, κηροῦ ἀμύγδαλον, δαρτίνης λάρικος (οὔγ.) α



ἥλικου. τὰ τμητὰ κατὰ τὸν ἔηρὸν καὶ ἀνελόμενον χρῶ. "Of copper flakes and scraped iron rust, one oz. each; of wax, one-half lb.; and of larch-resin, one and one-half oz. Add the melted soluble ingredients to the powdered dry ingredients. Mix together and use."

3. marg. See note to line 5, below.

3. τὸς υἱ: If υ is correct, πρῶτος ἔλαιον, swine-fat, comes to mind. It is found in A, 8; B, 10; and D, 6.

4. υἱας: κολοκυθίας, also a resin, is not likely here if λάπ[ικον is correct in line 2.

χα[ι: χαλκός is a most common ingredient in the medicinal plasters. Cf. note to line 2, above, for ἀντίδον χαλκοῦ together with βηρίνη: λάπικον.

5. Below this line is a 1 cm. blank space, which is filled with a long double-curving line in the second hand. Also in the second hand is a large check-mark, , in the margin opposite line 3, and a large right angle, , enclosing the beginnings of lines 4 and 5.

6-10. These lines are in the second hand and contain directions for mixing and for the use of a recipe. They probably pertain to the recipe immediately above in the body of the text, rather than to a recipe in the lower margin of the preceding page, which would also have been written by the second hand. Cf. note to line 5.

6. κρᾶσμα: "blending or mixing", usually of a diluting agent added to a medicinal preparation to make it ready for a particular use. Cf. Gal. XIII 524, 14: ἡ κρᾶσις εἶναι κατάλληλος τῷ ἀνθρώπῳ, "the blending should correspond to the condition of the body." The statement follows the list of ingredients and the directions for the mixing of a recipe of Asklepiades for a cicatrizing plaster. Cf. note to line 8, below.

7. μῖξας τὰς τοῖς υἱ: Possibly "having mixed three ... of ...," or "three times." Cf. 425, 9 καὶ γὰρ τὰ τὰ τέσσαρα μῖξας, "mix the four ingredients with equal amounts." Cf. also Grib. IV 601, 8 κρᾶσμα τὰς κρᾶσματινῆς (oby.) D.

8. δάκτυλ: (-δάκτυλ) ἀτὰ [ι: For the construction see D verso, 2-9, note. Several possibilities for -δάκτυλ: are θηρο-, κυνο-, ἀνθρωποδάκτυλ:, "for those who have suffered bites by wild beasts, dogs, men." For plasters to be applied in such circumstances, cf. Gal. XIII 437, 15: 558, 2; 560, 2; 774, 14; 779; 781; 788; 878, 11 et al. Cf. also note to 21 E, 14-15.

10. ἀτὰ χυλὸν γεν[τιανῆς: "with juice of gentian." Cf. Dsc. III 3.2, where the root of gentian, and especially its juice, is called a τοσαύτη and a remedy for spreading ulcers.

P.Mich. Inv. 21 K verso

6.5 x 7 cm.

Plate 11b

]υτα

]τε

]υ

(Hd. 2) 4

]κηρ[οῦ] (οὔγ.) γ

Δ]υνήσου (οὔγ.) γ

].ουβ...ου (οὔγ.) ζ

λιβ]άνου (οὔγ.) α

8

] στέατος τανω(τίου) (λίτρ.) α

5. Pap. κηρ

8. Pap. τανω

1-3. These are the last three lines of a page of the codex.

3. ]υ: Possibly πη]υ(νη, "pine resin", with or without ὀνίωνα. Cf. E, 11. στέατος ὄλου [ὀλέου] is not likely, since the diaeresis is always on the epsilon in our codex. See A, 8; B, 10; D, 6.

4-8. These five lines are in the second hand and follow a blank space of one line. If they contain a single recipe it must have had 15-20 ingredients, in view of the long lines produced by the second hand. Of the four ingredients - κηρ[οῦ], Δ]υνήσου, λιβ]άνου, and στέατος τανω(τίου) - only δύνωσον is not found in the several plasters of Galen, Aëtius and Paulus which contain the other three ingredients of our text, in addition to 6-17 further ingredients. Cf. Gal. XIII 544, 6, a καταμαστική, a "plaster for fractures" of Heras, which has 12 ingredients in all; 549, 16, a καταμαστική of Andromachus, which has 14 ingredients; 556, 10, another of Andromachus, called ἀνίκητος, "unbeatable", with 20 ingredients; Aët. XV, p. 69, 15, a similar plaster with 12 ingredients; Paul. VII 17.16 and 86, with 9 and 10 ingredients, respectively.

4. κηρ[οῦ] (οὔγ.) γ: 3 ounces of wax. For κηρός in the medical papyri, see Marganne, p. 362. Our codex has κηρός in twelve recipes.

5. Δ]υνήσου (οὔγ.) γ: 3 ounces of anise. For this ingredient in the medical papyri see Marganne, p. 356.

8. None of the recipes referred to in the note to lines 4-8, above, have an ingredient that will fit the remnants of ink in this line.

7. λιβ]άνου (οὔγ.) α: 1 ounce of frankincense. Also possible is πη]άνου. Cf. Gal. XIII 336, 11, a plaster of Andromachus for sciatica which has πη]άνου, κηροῦ, and στέατος τανω(τίου) and 15 additional ingredients.

8. στέατος τανω(τίου) (λίτρα) α: 1 pound of bull-fat. On the strength of the different kinds of animal fat see Aët. XV, p. 12, 8ff. στέατος τανω(τίου) is found again in our codex in B, 11.

9, marg. To the right of this line and slightly below is a large, very black dot of ink (3 x 4 mm.), probably used to mark the recipe for some purpose.

P.Mich. Inv. 21 L

5.8 x 6.5 cm.

Plate 12a

-----  
 της χαρ[  
 ἐνπλάστου [ον ± 9 ]  
 λιθαργύρου [υ ± 10 ]  
 4 ἐλαίου κοτ(ούλ.) [ ± 11 ]  
 τριῖβε τὴν [λιθαργύρον καὶ]  
 (Hd. 2) ἐνπλάστου πρὸς λιχ[ήνας ± 22 ]  
 θείου ἀπύρου (δού.) α τήλε[ω ± 25 ]  
 8 μετὰ τῶν ξηρῶν χ. [ ± 29 ]  
 ἀνάλου (ούγ.) ιβ ταυρ[οκόλλης ± 22 ]  
 [...]  
 -----

2. ἐνπλάστοιον 4. PAp. κοτ 6. λιχμήνας 7. θείου

1. της χαρ[. If της is the article, we probably have της χαρ[τηρίας κτεκαυμένης], which was the last line of a recipe. For χαρτηρία ( = χάρις), manufactured papyrus, used in medicine, cf. Gal. XII 94; Dsc. I 86. The latter has πάπυρος γνώριμος ἅδεν, ἀπ' ἧς ὁ χάρις κατασκευάζεται, εὐχρηστος δὲ εἰς τὴν (ιατρικὴν) χρῆσιν ..., "papyrus, from which paper is made, is known to all; it is especially useful for medicinal purposes." Cf. also H. δὲ κτεκαυμένη πάπυρος ἀπὸν τεφρῶσιν δύναται νοῦν ἐπὶ τὸν ἐν στόματι καὶ παντὶ μέρει βέλτερον δὲ ὁ χάρις κατὰ δὸς τὰ τοιοῦτον. "Papyrus, being burnt until it becomes ashes, can hold back spreading ulcers, those on the mouth and in every part. But burnt manufactured papyrus does this even better." Cf. Marganne, p. 373, for χαρτιάσιον and χάρις in the papyri. See esp. PSI X 1180, 49-50, ἐπὶ τῷ δὲ το(ῷ) φαρμάκῳ χαρτιάσιον ἐπιθεῖν, "place a small piece of papyrus over the medication."

After line 1 a space of one line was left blank in which are two wing-shaped signs ( ~ ) to mark the end of one recipe and the beginning of another. The first sign was extruded into the margin, and it is likely that one or two further signs have been lost in the missing portion of the papyrus.

2-5. These four lines are the last lines of a page of the codex and contain the beginning of a new recipe which was continued at the top of the next page.

2. ἐνπλάστου (ἐνπλ-): a diminutive of ἐνπλάστον. It was possibly followed by πρὸς λιχμήνας], aut sim. Cf. notes to lines 3-5 and line 6, below.

3-5. λιθαργύρου: litharge, lead monoxide, is frequently found first in the lists of ingredients for plasters. Cf. E, 6, note, and 10. It occurs in our codex in six different recipes. λιθαργύρου was followed by the amount and by another ingredient with its amount.



ἐλαίου κοτύλ.) [; this was followed by the number of kotylai of oil and by another ingredient with its amount.

An illustrative plaster containing four ingredients and water is the following (Gal. XII 844): "the moist white plaster, which the medical practitioner Magnus used for the removal of lichens": λιθαργύρου (λίτ.) α, κηρός (λίτ.) α ἐλαίου (ἐλ.) α, ψευδαίου (λίτ.) α, ὕδατος (ἐλ.) α. τριβε λιθαργύρον, ψευδαίον καὶ τὸ ὕδωρ, καὶ ὅταν λευκότερα γένηται, ἐπιβάλλε κατὰ μικρὸν τὸ ἐλαίον καὶ τριβε συνεχῶς, καὶ ὅταν ἐκωσθῇ, μετὰ εἰς ἀργεῖον κρημνοῦ καὶ ἐκτίθει ἐπὶ τὸ πρὸ συνεχῶς κινῶν, ὅταν δὲ τὸ ὕδωρ ἀναποσθῇ, ἐπιβάλλε τὸν κηρὸν καταπλάσας, καὶ ὅταν διαλυθῇ, εἰς συείαν μετεράσας καὶ καλὸς εἰς ἀνελάμενος χάω. "One lb. of litharge, one lb. of wax, one sextarius of oil, one lb. of white lead, and one sextarius of water. Pound together the litharge, white lead and water, and when they have become finely powdered, add the oil little by little, and rub again continuously. When it is well united, pour the mixture into a clay vessel and place over a fire, stirring continuously. When the water is absorbed, add the wax, and when it is diluted pour the mixture into a mortar, and having made it pliable, take it up and use." Other plaster-recipes, which have only four ingredients, two of which are litharge and oil, are the following: Gal. XIII 378, 4: 423, 13: 690, 8: Aët. XV, p. 112, 9; Paul. III 79.5; IV 14.2.

6-10. These lines are in the second hand. The writer left no space between his first line and the preceding text, but he extruded his lines 1.5 cm. into the margin. The recipe is for lichen-like skin eruptions, for which see the many compositions in Gal. XII 830-844. An illustrative recipe is the τροχίσκος λειαννικῶς (832, 18), ἀλκυονίδου κικαννίδου (6ρ.) β, χαμαιλέοντος μέλανος (6ρ.) δ, ἀσπιδίου δίχης (6ρ.) δ, θείου ἀπύρου (6ρ.) β, λιθωματοῦ (6ρ.) β, περὶθεου (6ρ.) β, σίτρου ἄφοου (6ρ.) β, ταυροκόλλης (6ρ.) δ, δέου τοῦ αἰστανίκο. "2 drachms of burnt alyonium, 4 dr. of black chameleon, 4 dr. of root of asphodel, 2 dr. of unfired sulphur, 2 dr. of rosemary, 2 dr. of pellitory, 2 dr. of sodium carbonate, 4 dr. of bull-hide glue, and enough vinegar." Cf. the recipes in PSI X 1180, 33-50, πρὸς λευχῆνας ἀγρίους, et al., with many of the same ingredients.

6. πρὸς λευχῆνας: If θείου ἀπύρου in line 7 was the first ingredient of the recipe, the remainder of line 6 may have held amplification of the lichens, or further similar affections. Cf. Aët. VIII 16, p. 423, 10, πρὸς λευχῆνας ἐν παντί τῷ σώματι: 423, 24, πρὸς λευχῆνας, πρὸς τοὺς ἀγρίους λευχῆνας: 424, 12, περὶχαιτῶς ἐσθὲ πρὸς λευχῆνας κηονίους: 424, 5, πρὸς λευχῆνας καὶ ἀλώεζας καὶ λέπρας: PSI X 1180, 36, πρὸς λέπρας καὶ ἀγρίους λευχῆνας καὶ ψώρας εἰδοκίμων, "a famous medication for leprosy, wild lichens, and scurvy."

7. θείου (θείου) ἀπύρου: "unfired sulphur". In 21 successive λειαννικῆ-recipes in Gal. XII 832-838, this ingredient is found in 18 of them. It is also found in PSI X 1180, 37 and 42.

τῆλε[ας: "fenugreek". Only one recipe of Galen's 21 λειαννικαὶ calls for this ingredient, 834, 12.

8. μετὰ τῶν ξηρῶν: "with the powdered dry ingredients," i.e. δριττον, τῆλις, and the following ingredients in line 7 and perhaps others after λιχῆ[ν] in line 6.

χ.[: The remnant of ink is a tiny oblique stroke that would especially suit upsilon in this hand. The ingredient should be the first of the solubles, which were continued in the next line with unsalted fat and bull-hide glue. For the structure, see 838, 10ff., where the minerals are listed first followed by directions for their preparation; then the plants are listed with directions, and finally the list of τὰ τεκτὰ which includes κροῦ, τεραινθίνης, and χαλβάτης, "wax, turpentine, and the resinous juice of all-heal." χαλβάτης is found in several other recipes for lichens and related affections. Cf. 843, 9; 844, 1; 846, 4. The only other ingredients which begin with χ in Galen's 21 recipes are classed as ξηρά: χαμαίλεοντος (6 recipes), χαλκάνθου (7), χαλκίτης (6), χαλκοῦ λιπίδος (2), and χαλκοῦ (1).

Also possible for χ. is χρ[υ]σοῦ. Cf. 831, 9, μολάχης ἀγρίας τοῦ κροῦ ἀπαλοῦ . . . τὸν χρυλόν, "the juice of the raw fruit of the marsh mallow"; 831, 11, ἀνόρρανης χρυλόν, "juice of purslane". Both juices were used alone as ointments for lichens and similar affections. Another recipe for lichens, 842, 13, calls for δριττον χρυλόν, "juice of deadly carrot".

9. ἀνάλου: "unsalted". The noun in the lost portion of the preceding line was almost surely στέατος, "fat". None of Galen's 21 successive recipes calls for fat. But the yellow plaster of Herophilus (843, 8), a λειχηνική, calls for στέατος κροχίου, "calf-suet". For a cataplasm for chilblains with στέατος χοιρείου ἀνάλου, "unsalted young pig fat", see Disc.Eup. I 171.4. Cf. also Gal. XII 677, 16; 21 A, 8-9, note, and footnote 34.

ταυροκόλλα: "bull-hide glue". This ingredient is found in 5 of Galen's 21 λειχηνική-recipes, mentioned above (see note to lines 6-10).

P.Mich. Inv. 21 L verso

5.8 x 6.5 cm.

Plate 12b

]. . . . .

] : παλαι

] δριττον

(MS.2) 4

]μα κροδαμίου

]ου ἀνά (οὐγ.) η νασείου

]

]τατ δίδου πίνειν

8

κ[α]λ[υ]πτουρίου (οὐγ.) τ

κ[α]λ[υ]πτουρία ἐν

3. δριττον

9. κ[α]λ[υ]πτουρίου

1-3. These are the last three lines of a page of the codex. For the probable content see note to 21 I, 1ff.

2-3. An illustrative supplement is the following: πρὸς τὰς παλαιὰς [ἀνθρακιν] ἀριττον, "the best remedy for chronic coughing." Cf. Dsc. III 6.3 γε κενταύρεον (which occurs in our text at line 8): ἀρωμαίνει δὲ ἡ δίζα πῆν-μασι, ἐκέρμασι, πλεονεκμοῖς, δυσπνοίᾳ, θηκὶ παλαιᾷ, κτλ. "The root is good for fractures, muscular sprains, pleurisy, shortness of breath, chronic coughing, etc." Cf. also Alex. Trall. II 181, 19 ἄλλο (ἀντιδότον) τοιοῦν καλῶς καὶ μάλιστα πρὸς τὰς χρόνιαν θήκα. "Another antidote which is especially effective for coughs of long standing."

4-9. These lines are in the second hand and contain three separate recipes (lines 4-5, 7, and 8-9). A space of 1.5 cm. was left between lines 3 and 4, and a margin of 1 cm. remains below line 9.

4-5. καρδαμύμου, νασίου: Cardamum and mustard are the only ingredients preserved in the first recipe, plus the ending of another, ].ου. They are reminiscent of an anodyne of Galen for coughs and the expulsion of gas (XIII 59, 10ff.): ἄλλο (κοπιόριον) πρὸς θήκα καὶ ἀναγωγὴν πνεύματος, πᾶν καλῶς ἐκκαθαίρον. ὑσώπου, γλῆκωνος ἀνὰ (τοῦ.) β, ἱρως, νάπυος στέρωματος, καρδαμύμου ἀνὰ (τοῦ.) α, ἀνίσου, πεπτόσεως ἀνὰ (τοῦ.) α. κῶφας, σῆκαρ ἀναλαμβάνει μέλιτι ἀπύρρον, ἡ δόσις κοχλιασίου καλοῦ. "Another lozenge for coughs and the expulsion of gas. It is also a very good cleanser. Of hyssop and pennyroyal, 2 oz. each; of iris, mustard seed, and cardamum, 1 oz. each; of anise and pepper, 1 oz. each. Pound the ingredients and put through a sieve. Take with boiled honey. The dose is a good spoonful." Of the five ingredients in addition to cardamum and mustard, only ὑσώπου and ἀνίσου end in -ου, and since the remnant of a letter in line 5 of our text before ου is a vertical, the original text may well have had ὑσώπου. And line 4 may have had [πρὸς θήκα καὶ ἀναγωγὴν πνεύματος πόση]μα, aut sim. For πόσημα, see 21 J, 7.

6. This partial line had the amount of mustard - perhaps seed of mustard - and the directions for taking the medication.

7. The remedy in this line was complete in the space of one line. For many very brief recipes for pills and potions for internal disorders, cf. the "common" or "family medications" of Galen in his περὶ εὐπορέσιων (XIV 450ff.). Many end with δίδου πίνειν, as in our line 7, e.g., 450, 16 πρὸς τὰς τοῦ στομάχου ἀτονίας, δίνουσι πορευμένον λείον μετὰ ὕδατος δίδου πίνειν, "For weakness of the stomach give pounded burnt mustard with water to drink." 451, 18 ἄλλο, τὸ εὐνέπωσ στέουσι κκαυμένον ποίωσ καὶ σὺν ὕδατι δίδου πίνειν. "Finely rub the burnt seed of mustard and give as a potion with water."

Our text has ]εας before δίδου πίνειν. Cf. 456, 3 ἄλλο, βοτάνην ὑπερικῶν καὶ ἀδίσαντον ἐν ὕδατι βόησας δὲς πίνειν. "Give as a potion the herb St. John's wort and maidenhair boiled in water." 457, 10 ἄλλο, γῆς ἐντερων λεπτοτριβήσας δίδου πίνειν. "Give as a potion finely-pounded earth-worms." 461, 7 ἄλλο, κοπάρσεως δίζαν κοπανήσας καὶ ἔσας μετ' ἄβρους καὶ μέλιτος δίδου πίνειν νῆσται. "Finely pound and boil the root of the caper-plant with vinegar and honey,

and give to drink on an empty stomach." 466, 14 ἄλλο. κνίκον καὶ τήλεα τρίψας καὶ ἐψήσας δίδου ἀφύσκητα πίνειν. "Finely pound and boil safflower and fennugreek and give the decoction as a potion." For the papyri see P.Oxy. VIII 1088, 44.55.61; P.Ryl. III 531, 11; PSI VI 718, 5.

8-9. κενταυρίου (ῥύζ.) γ. 3 oz. of centaury: cf. Dsc. III 6 and 7; Gal. XII 19ff.; and note to lines 2-3, above. Cf. also P.Oxy. VIII 1088, 56ff.

κοχλιάρια ἐν: read κοχλιαρίον ἐν. Cf. Gal. XIV 458, 17 for one of the brief recipes for splenetic ilis, ἄλλο. κενταυρίου λεπτοῦ γεγηρακότες, κοπτομένου ἐν ὀλίμῳ δίδου κοχλιαρίου τὸ πλῆθος ἀπυρέτοις. "Pound fine in a mortar full-grown centaury, the slender variety, and give a spoonful to patients without fever." 467, 15 Another, for gastric diarrhoea: καρῶν φλοιὸν τὸν περιεσπυμένον περὶ τὰ τρωγόμενα, λεῖον δι' ὕδατος, δίδου πλεῖν κοχλιάρια γ. "Give 3 spoonfuls of a potion made of the skins of nuts, those which lie next to the nutmeats, which have been pounded fine with water." 521, 13, for flatulence of the stomach: πιπέρως, βαυνίδων, κυμίνου, ἀνίσου [καὶ κόψας καὶ χέσας δίδου νήστευε μετὰ εὐκράτου κοχλιαρίου α, ἐπὶ ἡμέρας τρεῖς. "Pound and sift equal amounts of pepper, bayberries, cummin, and anise, and give one spoonful with mixed wine and water, on an empty stomach, for three days."

P.Mich. Inv. 21 M

8.3 x 7.2 cm.

Plate 13a

[.] [ ]  
 καὶ κατα[  
 θυνησ ποδὲ ... [ ]  
 τὰ νόγ'ματα [ ]  
 (Hd. 2) { κα... [ ]... πικρὰς κ[ ]  
 ... (ῥύζ.) ἢ [ ]... [ ]... (ῥύζ.) γ ψευδίστου  
 ... (ῥύζ.) καὶ ἐστὶ [ ]  
 { ποδὲ (ῥύζ.) πικρὰς καὶ [ ]  
 πικρὰς καὶ [ ] δὴν [ ]  
 ἡμέρας ἐπὶ [ ] ὑδατος [ ]  
 ἡ ποσὶ τὸ λευκὸν [ ]

2. καὶ: γ corr. fr. 5. 4. γ inserted above the line by the original scribe.

1-4. These lines are the last four lines of a page of the codex and are the concluding lines of a recipe, as shown by the unusually deep lower margin (5.5 cm.) and the wedge-shaped signs placed by the scribe below the text. Lines 3-4 relate to the uses of the plaster, while line 2 may have held the final direction for its composition.

2. καὶ: Possible verb forms are καί, aor. inf. of χέω, and καί = χέει. But the uncompounded verb is rarely used; while ἐπι-, ἀπο-, παρ-, and συν-χέω are frequently found in the directions for mixing medications. Cf., e.g.

Aët. XV, p. 108, 15ff. for the conclusion of a recipe for scrofulous swellings of the glands of the neck (χοιροσώτες) and for all indurations: καὶ ἐνώσας τῆκε πιτυρίην καὶ ἔλαιον, καὶ διηθήσας ἐπιβάλλε τὴν πρόπολιν προμεταλαγμένην· καὶ τακείης ταύτης ἐπίσασσε τὴν γῆνιν, καὶ ἐνώσας ἐπύχε τοῖς λειωθεῖσιν ἐν θυίῳ, καὶ συμμαλάξας ἱκανῶς χρᾶ. "Having mixed them together, melt the pine resin and oil, and having strained it add the previously softened bee-glue. Then sprinkle over the melted mixture the fine meal, and, having mixed them together, pour it over the powdered dry ingredients in a mortar. Make the medication sufficiently malleable and use."

3. θύνη: Possibly ὀθύνη. Cf. Gal. XII 677, 4: εἰσι καὶ ἐμπλαστρά πολλὰ διασπορέσαι παρωτίδας, αἱ μὲν τινες τὰς ἡδὴ σκισσομένους καὶ κεκοσμημένους, αἱ δὲ τὰς πεποιημένους μὲν τῆς ὀδύνης ... "There are many plasters which disperse tumors of the parotid glands, some of which are already indurated and chronic, and which cause the pain to cease." XIII 967, 15 πρὸς τὰς τῶν ὀστέων ὀδύναις, "for pains of the joints." Paul. VII 17.46 ὁ Νέρωνος πρὸς πληγὰς καὶ πᾶσαν ὀδύνην τῶν σαρκωδῶν μερῶν, "the plaster of Nero for blows and all pains of the fleshy parts."

πρὸς ...[: Possibly πρὸς λυγίματα καὶ or πρὸς ἔξαρθήματα καὶ]. See the following note.

4. τὰ νόγ'ματα: "lesions of the tendons", as opposed to ἑλκος, flesh-lesions, and κατάγμα, bone-lesions (LSJ). Gal. XIII 947, 8, a plaster of Heras, ἀφλέγμαντος πρὸς τὰ νόγματα καὶ κατάγματα. ταύτη πολλὰκις καὶ ἐπὶ ἔξαρθήμασιν αὐθιγμοῖσιν ἐχρησάμεθα καὶ καταγμάτων (ἐπὶ τοῖς λυγισμοῖσιν τῶν περὶ σφυρῶν ἢ γόνα). "An inflammation-inhibiting plaster for tendon-lesions and fractures. Many times we have used this composition immediately for dislocations, fractures, and sprains of the ankle or knee."

[: Possibly καὶ κατάγματα]. See the preceding note. Also possible is one of the following conditions found with νόγματα (Aët. XV, p. 82, 8): ποιοῖται πρὸς πληγὰς, καὶ κοῦβητας, σπλάγχνα, σπλάγχνα, ὀστέα, νόγματα, "the plaster is good for strikes, blows, sprains, muscle-strains, breaks, and tendon-lesions."

5-11. These lines are in the second hand. The writer left a 1.5 cm. space between his lines and the preceding text, and he began his lines 1 cm. to the left of the margin set by the text above. Four symbols (see text) have been placed in the margin opposite lines 5-6, 7-8, 9, and 10, which may indicate approval of separate recipes, or of special uses of a single recipe with different liquids. The papyrus has been severely damaged by abrasion and a large hole.

5. κ....[: κατάγματις is too long for the space and does not fit the remnants of ink.

πίσας κ[: Possibly πίσας κ(ηροῦ ἀνὰ τοῦγ.), "pitch and wax, so many ounces of each." Cf. 21 B, 9. κίολοφάνις is also possible.



6. [...]oc: Possibly [μικρο]oc, masy. κτέατος is usually qualified by the type of animal fat.

ψ[μ]ιθλου: "white lead" is found in five recipes in our codex. For the spelling see A, 10, note.

7. ....[.....] καὶ ἐστὶ: Possibly ἐμπλ[οκτρος] καὶ ἐστὶ [ἀγαθὴ, aut sim. "It is a good plaster" for ...

8. πρὸς [εὐ]ριγγας καὶ: "for abscesses and ..." Cf., e.g., Gal. XIII 520, 15 κολλᾷ δὲ καὶ κόλπους καὶ εὐριγγας, "the plaster agglutinates fistulous ulcers and abscesses"; 807, 14 πρὸς εὐριγγας καὶ τὰ μελανόμενα ἢ νομάς, "for abscesses, blackened flesh, or spreading ulcers." Cf. C, 10 and note [ ] loc.

9. εὐριγγα κ[α]ὶ ὀήγμ[α]: Possibly πρὸς [ ] εὐριγγα κ[α]ὶ ὀήγμ[α] μετὰ ἔλαιου, aut sim. "For an abscess or a break triturate with oil, aut sim." Cf. D verso, 2-9, with notes.

10. ὠμῆς: "raw, crude", of minerals; "uncooked, unripe", of fruits and plants. The noun, lost at the end of the preceding line, was feminine.

ἐπ[ι] μύστω[ς]: "for closing of." Cf. LSJ for references for u. σιουίων, σιουάου, πόρων. Cf. also Osc. I 56 (p. 52, 20) te [ρινον; II 102. re tñli; Osc. Sup. II 72 τὰς δὲ φλεγμονὰς τῆς ὀστέρας καὶ ὑστίας καὶ ἀλγῆματα ἀπεφθόμενα εἰς ἐγκάθισματα ὠφέλει κτλ. "Decoctions for sitz-baths are beneficial in cases of inflammations of the womb, closings, and pain."

Also possible in our text is μύστω[ς] and ἐπ[ι] μύστω[ς] or -[ς]. For the latter see Scr. 2.18.

11. ἡ ψοῦ τὸ λευκόν: "or the white [ ] an egg." Cf., e.g., Paul. III 59.5 ἄλλο, πρὸς φλεγμονὴν δακτυλίου. ... ἡ ψευδοῖον καὶ ψοῦ τὸ λευκόν καὶ ῥόδινον ἐν τῇ αὐτῇ [γρίφ] λειώσας ἕως γλοιώδους γένηται, κατόχρει. "Another ointment for inflammation of the anus. White lead with the white [ ] an egg and rose oil, triturated in the same mortar until it has the consistency of a thin oil. Anoint the patient." Cf. A verso, 7.

P.Mich. Inv. 21 M verso

8.3 x 7.2 cm.

Plate 13b

[μας  
 ] (δρ.) κβ κπρδ  
 ] το... κτε  
 4 ]... αὐτὴν γενε-  
 ] θρα.ε.ε. συν  
 (Hd.2) ]... τα. πρὸ[....] α. [.] α  
 ]....[.] πρὸς [....]  
 8 ]... β. [.] τπ[....]  
 ]... α. [.] [....]  
 ]... α. [.] [....]  
 ]... α. [.] [....]



1-5. These are the ends of the last five lines of a page of the codex. The papyrus has suffered considerably from abrasion, even more than the recto side. See note to M. 5-11, ad fin.

6-11. These lines are in the second hand. The writer left no space between his lines and the preceding text. The severe damage to the papyrus makes any comments valueless.

## INDEX OF WORDS

- Ἀσανίτης B, 2  
 ἀδελφῶ C, 3  
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 δοσις I, 1  
 (δραχμή) passim  
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 δυσπεψία J, 5, n.  
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 εἴς L v. 9  
 ἐκ B, 8; C, 7  
 ἐκπύρω E v. 8  
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 ἔλαττον B, 13  
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 ἐμνοτός A v. 5.7; D, 10  
 ἐμπλαστός H, 7  
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 ἐμπλαστρός C v. 2; E, 5; F, 10; H, 4; H v. 6; L, 6  
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 ἐνδοξος B, 4  
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- ἐπιμυσία M, 10, n.  
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 ἔσθης A v. 8  
 ἐρυείπελας A v. 9  
 ἕτερος F, 2, n.  
 ἑδυνός J, 8  
 ἑφθός D, 10  
 ἔχω B, 2; F, 14  
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 ἑμύονη C v. 6; D, 13  
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 ἥρως E, 5  
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 ἱερά E, 5, n.  
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 καῖω B v. 8  
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- κατατέμνω F v. 4-5  
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 κόλπος A v. 12; B, 6; B v. 4; H v. 2  
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 κράμβη D v. 14  
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 κροκώδης G, 5  
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 λέγω A, 7  
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 λεπτός A, 3; F v. 4  
 λευκός A, 10; C v. 2.7; M, 11  
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 (λίτρα) E, 6-8.12; E v. 4.5; K v. 8  
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 λοπηρός B v. 5, n.  
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 νεύραν A v. 9  
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 ό ή τό passim αὐ δέ D, 14  
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 οξας D, 15; D v. 7  
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 όπιός G v. 7  
 όρνίθειος H v. 7  
 όρτέον A v. 11  
 όταν B, 12; C, 4  
 (οούγγια) passim  
 ούλή H v. 2 interl., 6  
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 πεύκινος B, 11  
 πηγαιπρά C, 7  
 πήγανον E v. 2, n.; K v. 7, n.  
 πίνω L v. 7

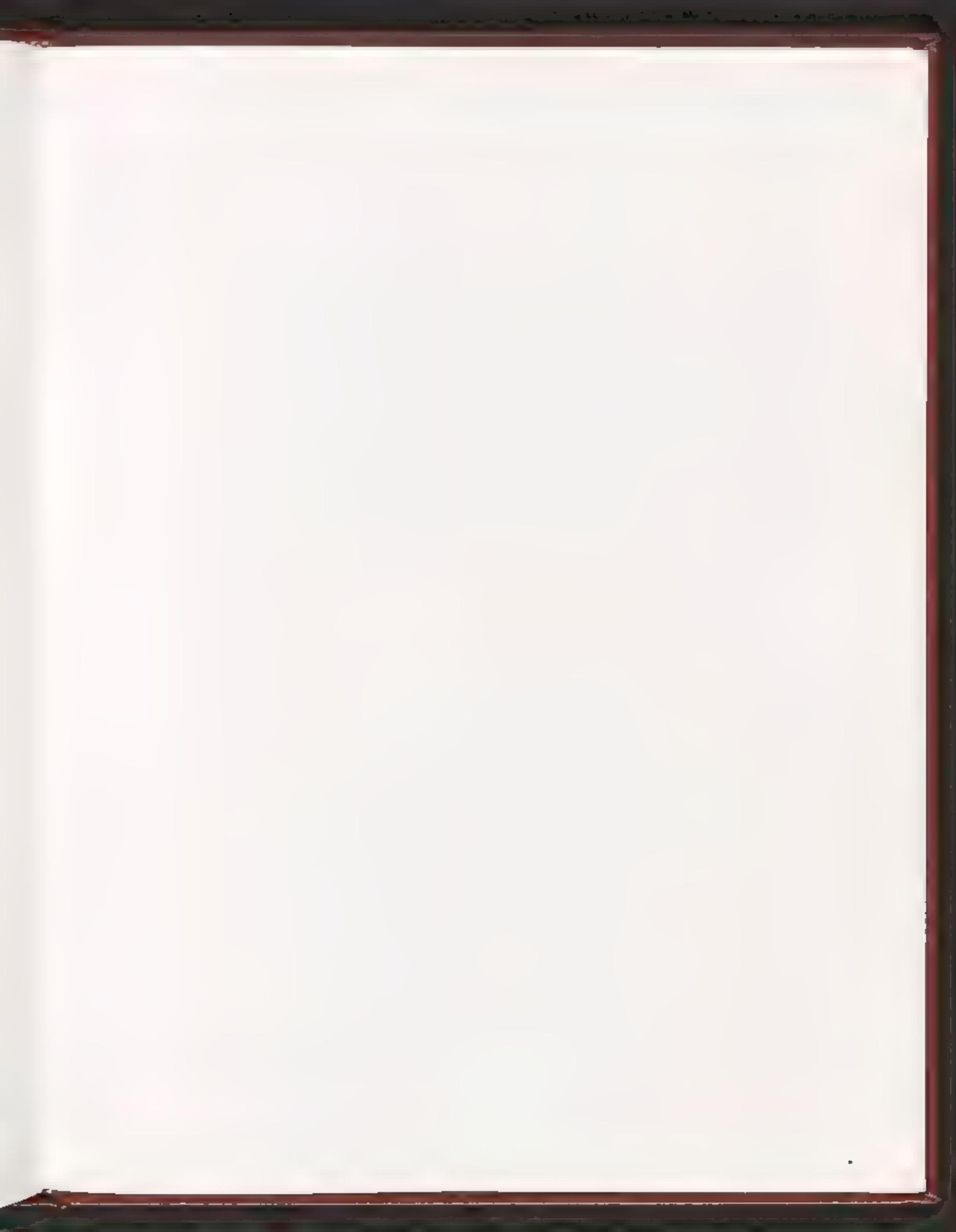


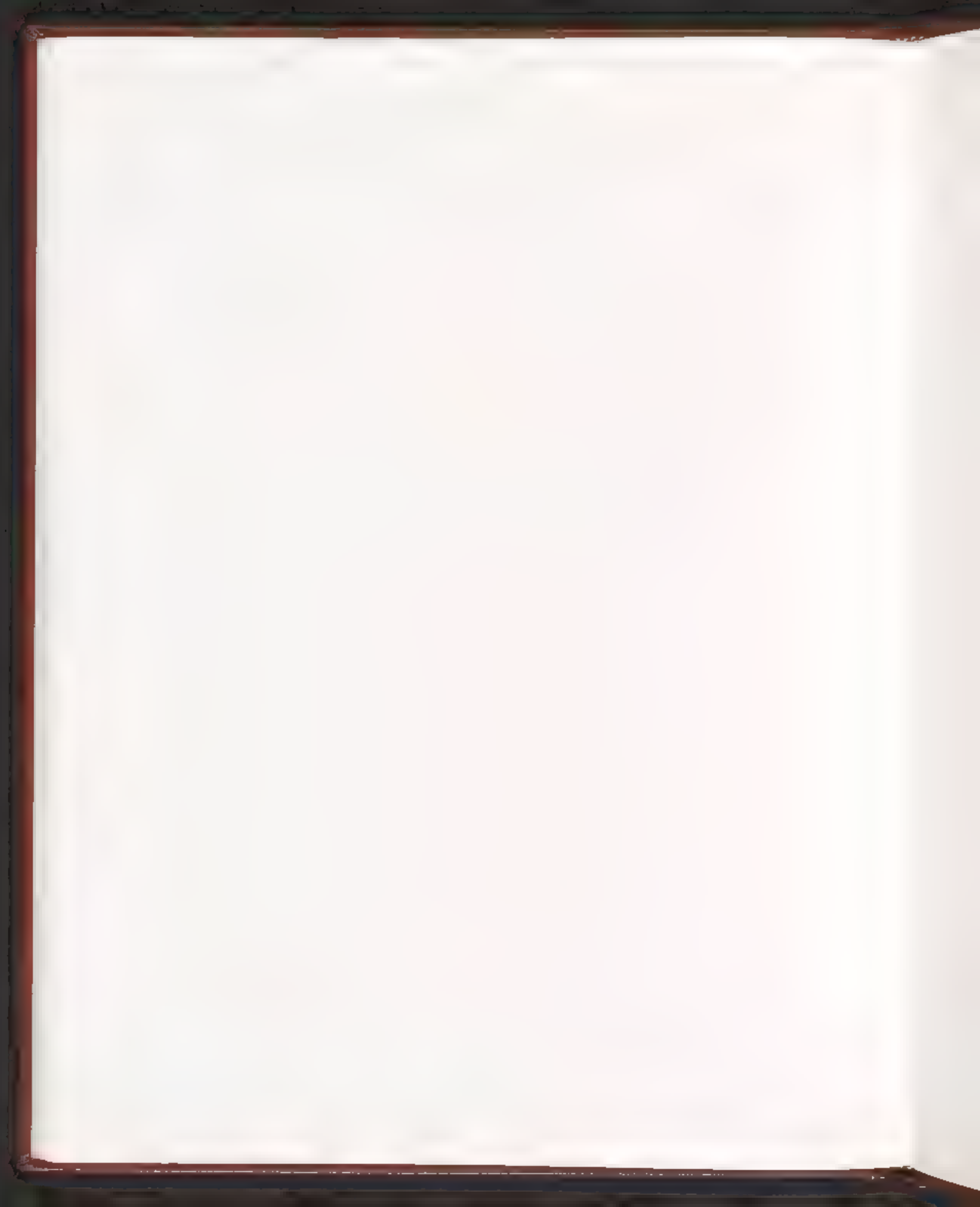
- ήλσα B, 9; M, 5  
 ηιθύνας E, 11; K v, 3, n.  
 ηλεών B, 12  
 ηληγ E, 15  
 ηληρόω D, 3; H v, 4, πατq.  
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 G, 1; H v, 3.4.5; L, 6; M, 3.8; M v, 7  
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 ταυροκόλλα G, 6, n.; L, 9  
 τε F, 8  
 τελαμώνιος E, 9  
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 (τέταρτον) A, 9.10; C v. 4-6  
 τηκτός A, 11; B v. 12; C, 5; E, 2; E v. 14, n.; H v. 8  
 τήκω D, 7; E v. 14, n.; F, 13  
 τήλιος E v. 4.7; L, 7  
 τόμος C, 8  
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 τρεῖς C v. 8; K, 7  
 τριῖω L, 5  
 ὕγεινός D, 4  
 ὕγρος A v. 7; F, 14  
 ὕειος A, 8; B, 10; D, 6; K, 3, n.  
 ὑπολείπω E v. 9-10  
 ὑποτείνω A, 2-4, n.  
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 φημί A, 9  
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 χαλκός D, 11; E, 7; K, 4, n.  
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χρησις H, 10, marg.; M, 9, marg.  
χρόνος A, 12  
χυλός C, 5; D v. 4.9; E v. 11-12; K, 10  
χωρίς G, 7, π.  
ψαλίδιον A, 10; B v. 10; E, 10-11; M, 6  
ώμος D, 5; M, 10  
ὥον C v. 7; M, 11





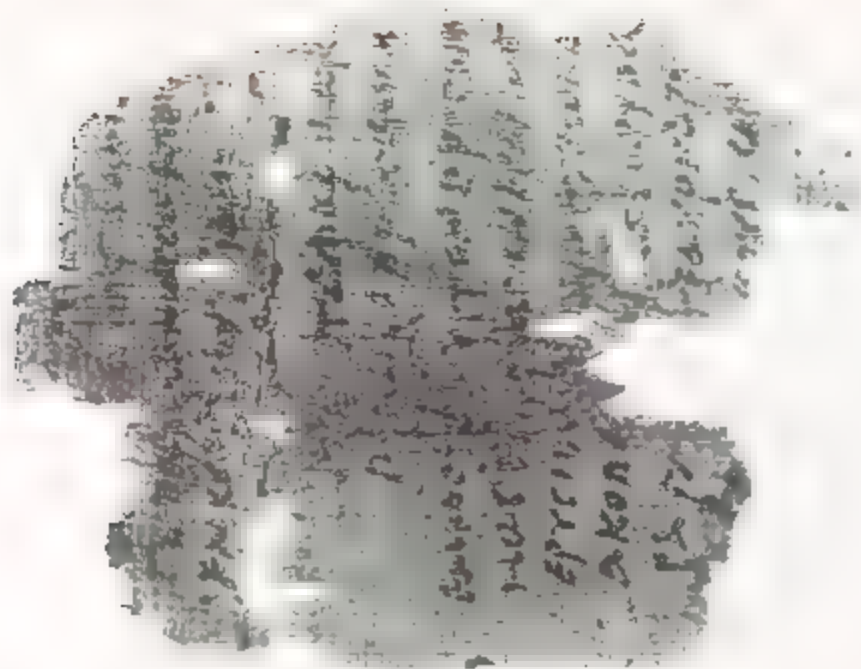




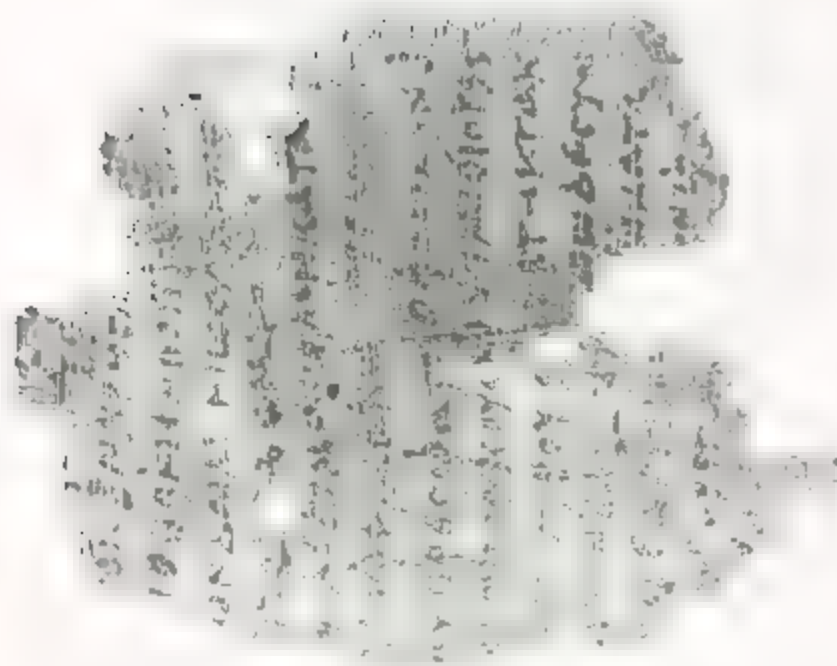




# PLATE I



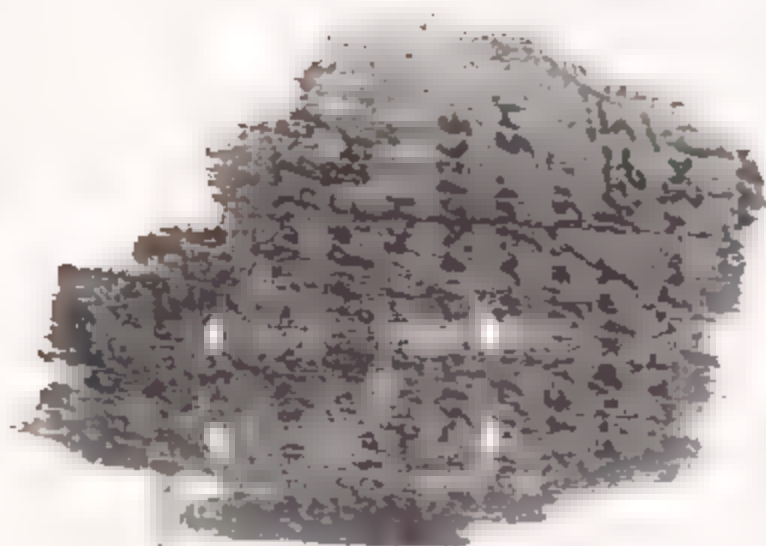
b)



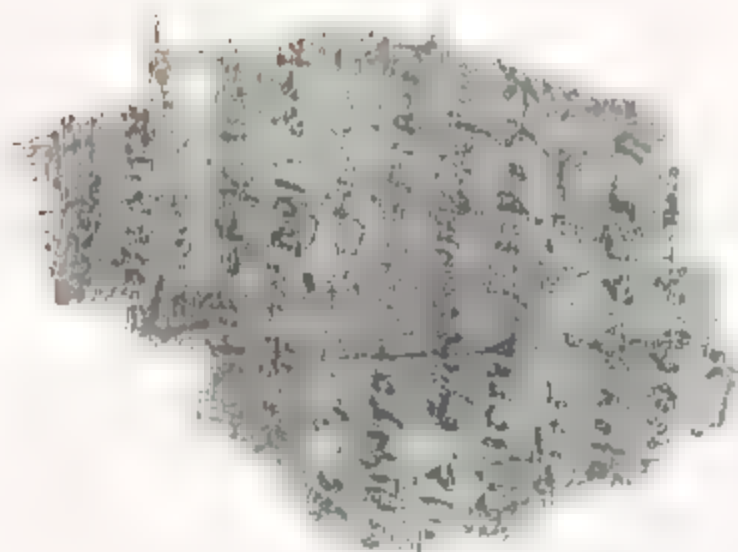
a)

- a) P. Mich. XVII 758 (inv. 21) A recto (page 4)
- b) P. Mich. XVII 758 (inv. 21) A verso (page 10)

# PLATE 2



b)



a)

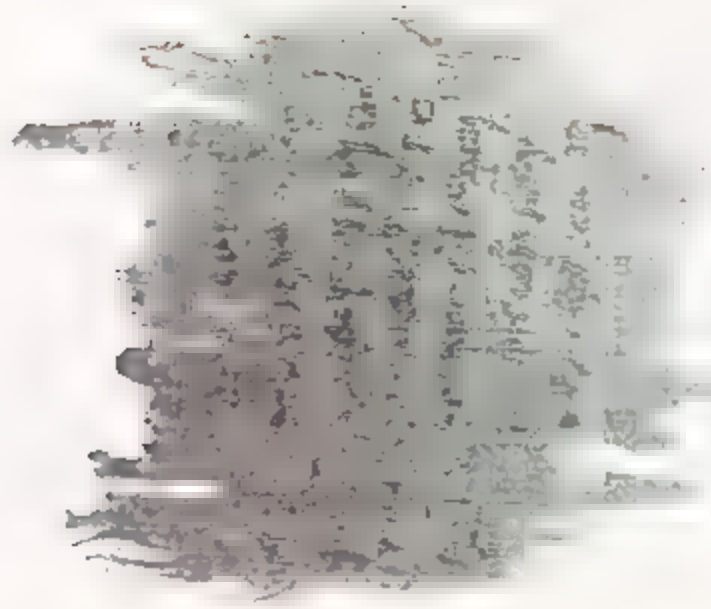
- a) P. Mich. XVII 758 (inv. 21) B recto (page 13)
- b) P. Mich. XVII 758 (inv. 21) B verso (pages 17-8)



PLATE 3



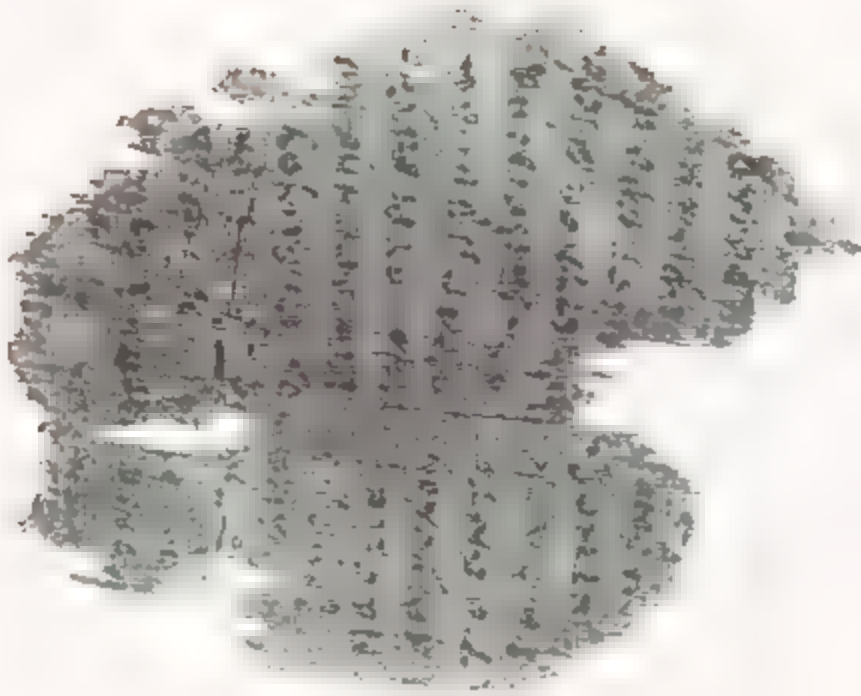
a)



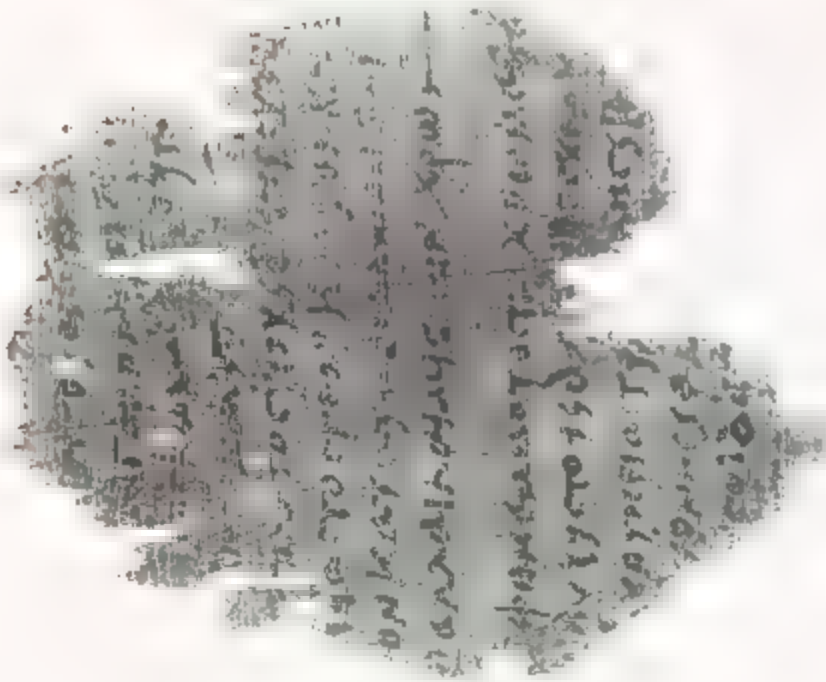
b)

- a) P. Mich. XVII 758 (inv. 21) C recto (page 22)
- b) P. Mich. XVII 758 (inv. 21) C verso (pages 23-4)

# PLATE 4



b)

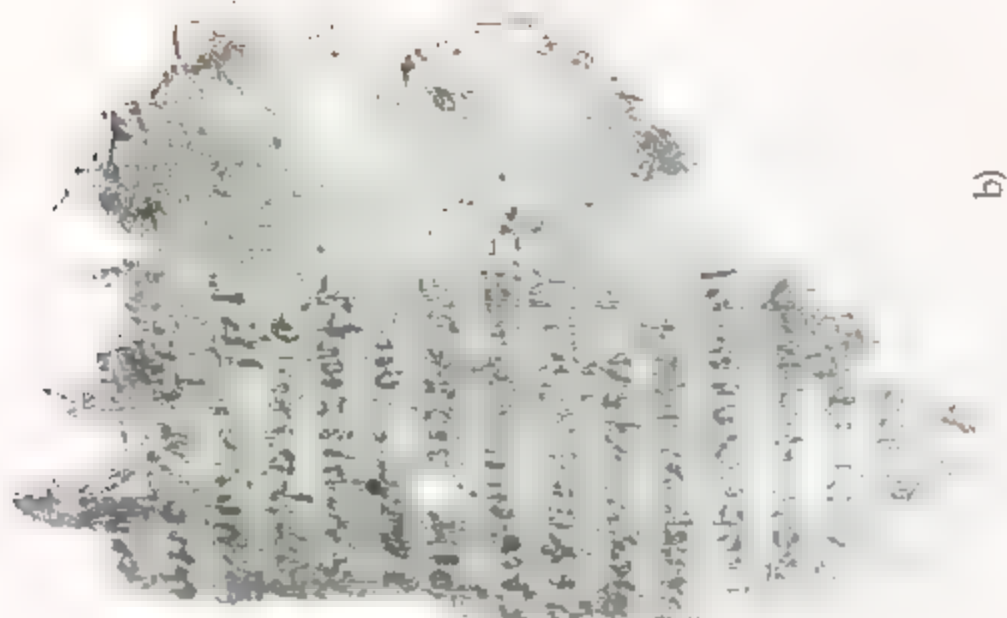


a)

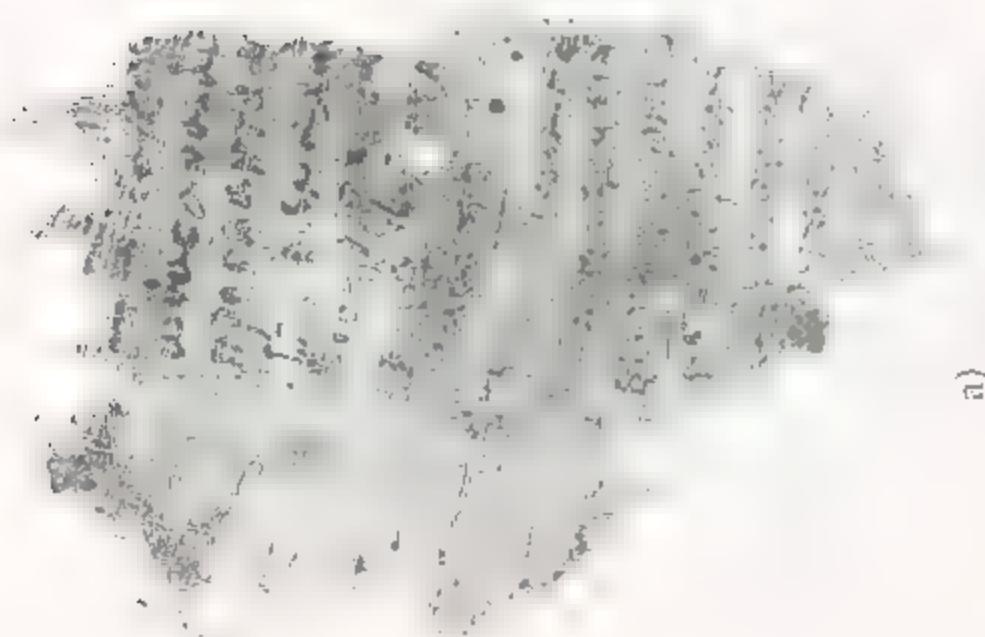
- a) P.Mich. XVII 758 (inv.21) D recto (page 28)
- b) P.Mich. XVII 758 (inv.21) D verso (pages 32-3)



# PLATE 5



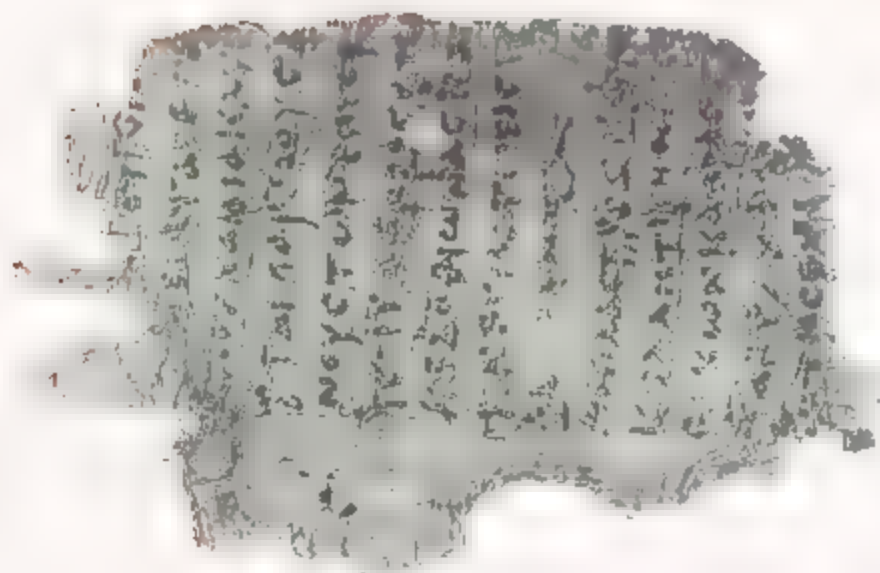
b)



a)

- a) P.Mich. XVII 758 (inv.21) E recto (page 36)
- b) P.Mich. XVII 758 (inv.21) E verso (page 44)

# PLATE 6



a)



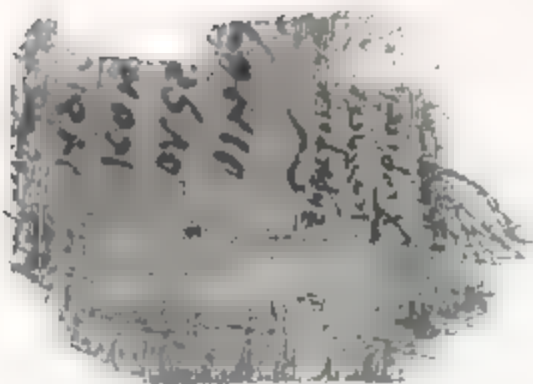
b)

- a) P. Mich. XVII 758 (inv. 21) F recto (page 49)
- b) P. Mich. XVII 758 (inv. 21) F verso (page 53)

# PLATE 7

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



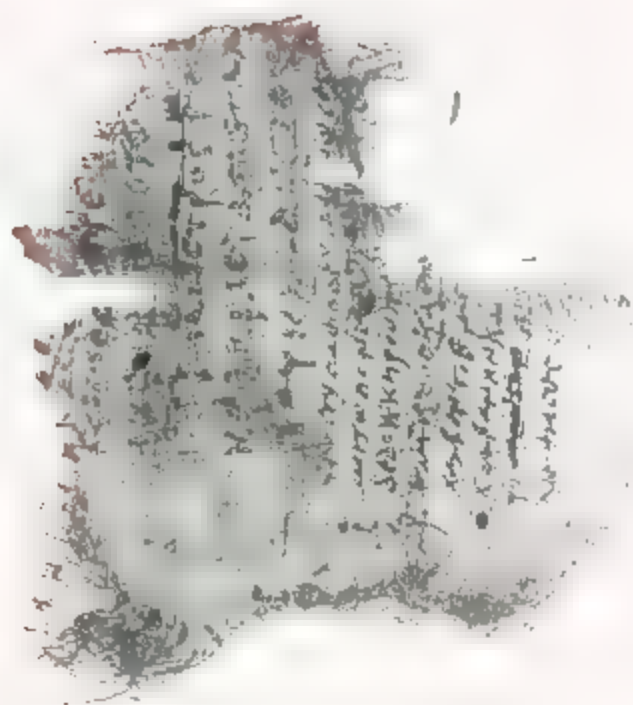
a)



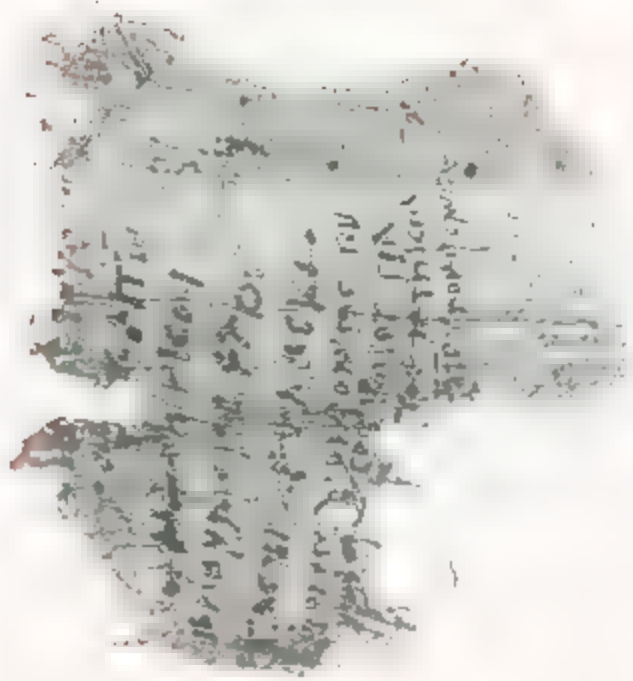
b)

- a) P.Mich. XVII 758 (inv.21) G recto (page 56)
- b) P.Mich. XVII 758 (inv.21) G verso (pages 58-9)

# PLATE 8



a)



b)

- a) P. Mich. XVII 758 (inv. 21) H recto (page 59)
- b) P. Mich. XVII 758 (inv. 21) H verso (page 61)

# PLATE 9



a)



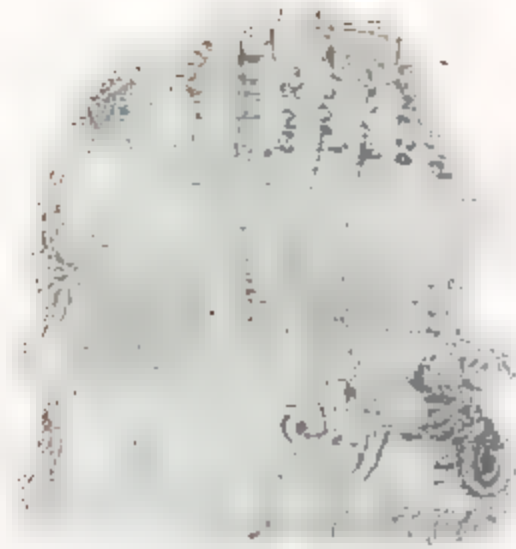
b)

- a) P. Mich. XVII 758 (inv. 21) I recto (pages 63-4)
- b) P. Mich. XVII 758 (inv. 21) I verso (page 65)

PLATE 10



a)

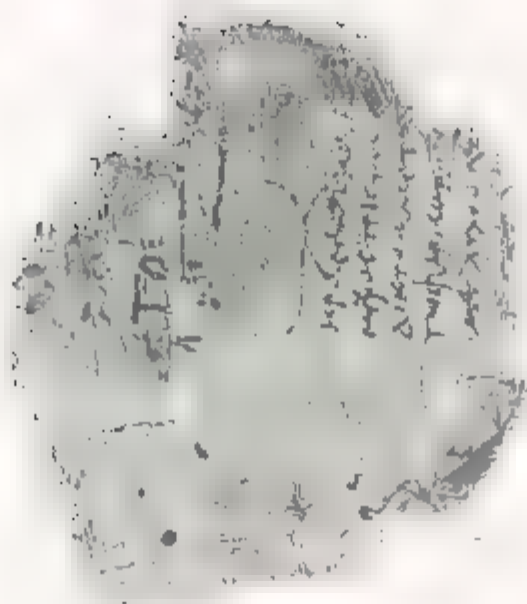


b)

- a) P. Mich. XVII 758 (inv. 21) J recto (pages 66-7)
- b) P. Mich. XVII 758 (inv. 21) J verso (page 68)



# PLATE 11



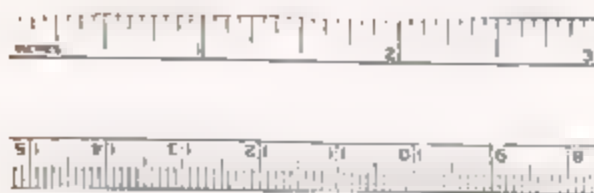
a)



b)

- a) P. Mich. XVII 758 (inv. 21) K recto (page 69)
- b) P. Mich. XVII 758 (inv. 21) K verso (page 71)

PLATE 12



ΠΝΑΝΟΝ  
 418 α. 1535 90  
 Ρ 5210716.33  
 77 337  
 ΠΑΝΤΕΡΑΝΤΟΝ  
 418 α. 1535 90  
 Ρ 5210716.33  
 77 337

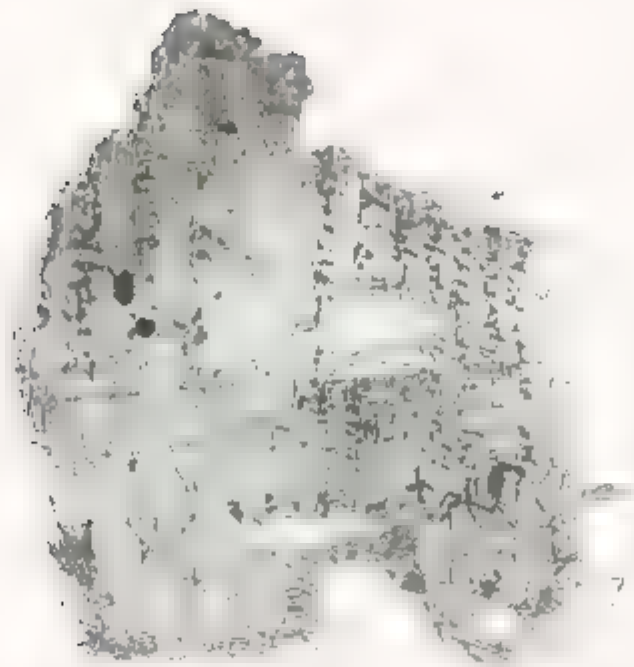
a)

ΠΝΑΝΟΝ  
 418 α. 1535 90  
 Ρ 5210716.33  
 77 337  
 ΠΑΝΤΕΡΑΝΤΟΝ  
 418 α. 1535 90  
 Ρ 5210716.33  
 77 337

b)

- a) P. Mich. XVII 758 (inv. 21) L recto (page 72)
- b) P. Mich. XVII 758 (inv. 21) L verso (page 74)

PLATE 13



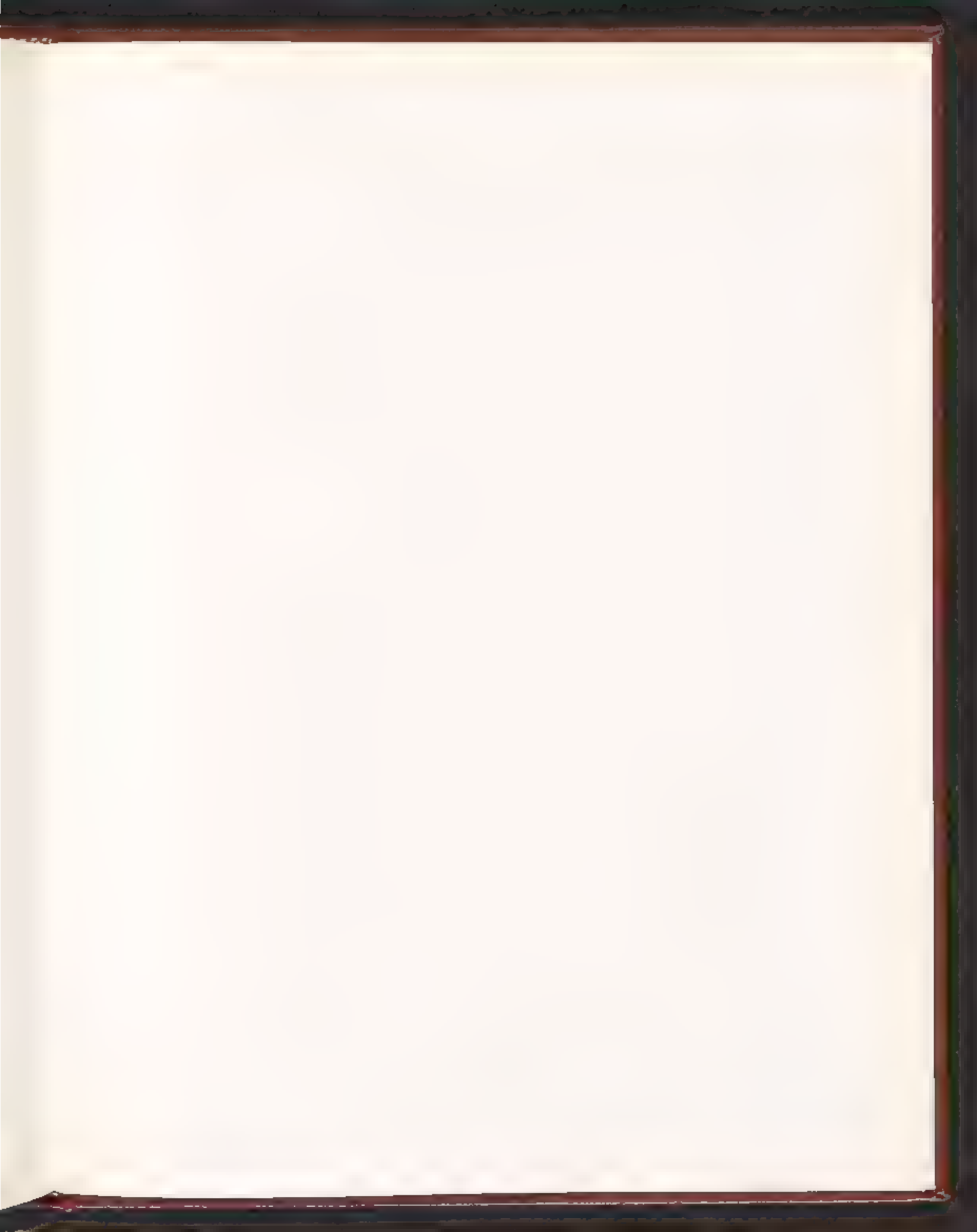
a)



b)

- a) P. Mich. XVII 758 (inv. 21) M recto (page 76)  
b) P. Mich. XVII 758 (inv. 21) M verso (page 78)











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